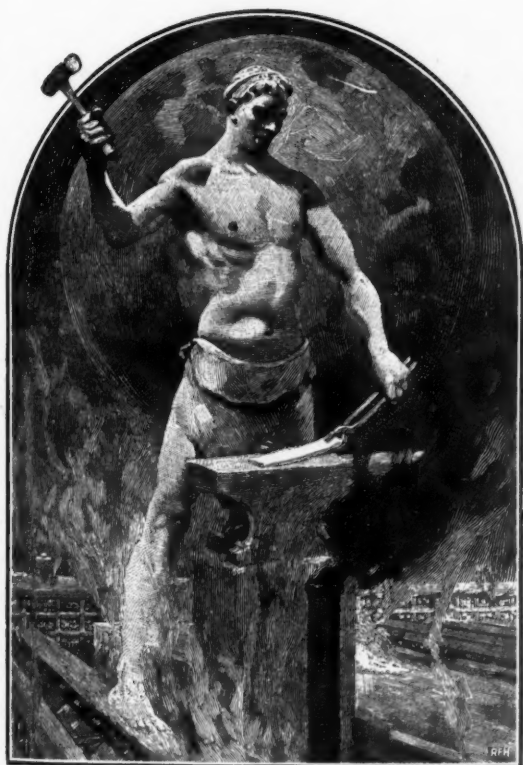


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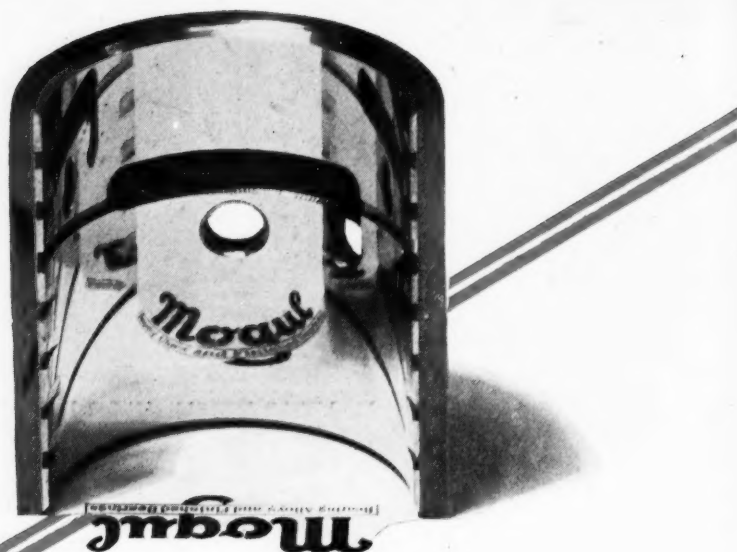


A check-up of the changes in automobile body hardware design and construction within the past few years would show that almost all of the noteworthy advancements have been devised and perfected by

TERNSTEDT

WORLD'S LARGEST MANUFACTURERS OF AUTOMOBILE BODY HARDWARE

Division of Fisher Body Corporation
DETROIT U. S. A.



The natural reflection of the trademark in this highly polished bearing surface indicates the perfect bearing surface of Federal-Mogul Close Limit Interchangeable Bearings. This is an unretouched photograph.

Here is a bearing machined to accuracy limits never before heard of in bearing production. This reduces assembly costs and insures a 100% perfect bearing surface. With these and many other advantages, is it any wonder that our entire production on Federal-Mogul Close Limit Interchangeable bearings has been sold for some weeks to come.

These bearings are now being used by Overland 6, Willys-Knight 4 and 6, Federal-Knight Truck, Jewett and others.

A brief has been prepared setting forth the advantages and merits of this finest of engine bearings. It will be sent on request to Automotive Engineers and others who may be interested. Just ask for the Close Limit Interchangeable Brief.

FEDERAL-MOGUL CORPORATION

A consolidation of the Federal Bearing and Bushing Corporation and the Muzzy-Lyon Company.

DETROIT, MICHIGAN

Federal Mogul FEDERAL

"A Manufacturer's Reputation Is Safe with Federal-Mogul"



A good place to have his dollars working

Confidence in Future of Industry Shown by Dodge Purchase

Ultra-conservative banking interests now regard automobile business
as preferred investment. Compete for chance to get in.

By Norman G. Shidle

BANKERS—that noted race of ultra-conservatives—have just put something over \$150,000,000 in one lump into the automobile industry.

And they did it voluntarily. In fact, several of them were competing for the chance.

Bankers have been seen trying to get their money out of automotive concerns many times in the past, but on only a few occasions has there been strenuous rivalry to put it in.

Bankers have paid a good many millions into automobile companies before this, but they parted with their money very reluctantly in more than a few instances.

The spectacle of two great financial houses striving for an opportunity to put their money into an automotive property has greater significance than is contained merely in the fabulous sums involved in the transaction. It shows a thorough confidence in the future of the automobile industry on the part of the most conservative business elements in the country. This fact is of importance to the whole industry.

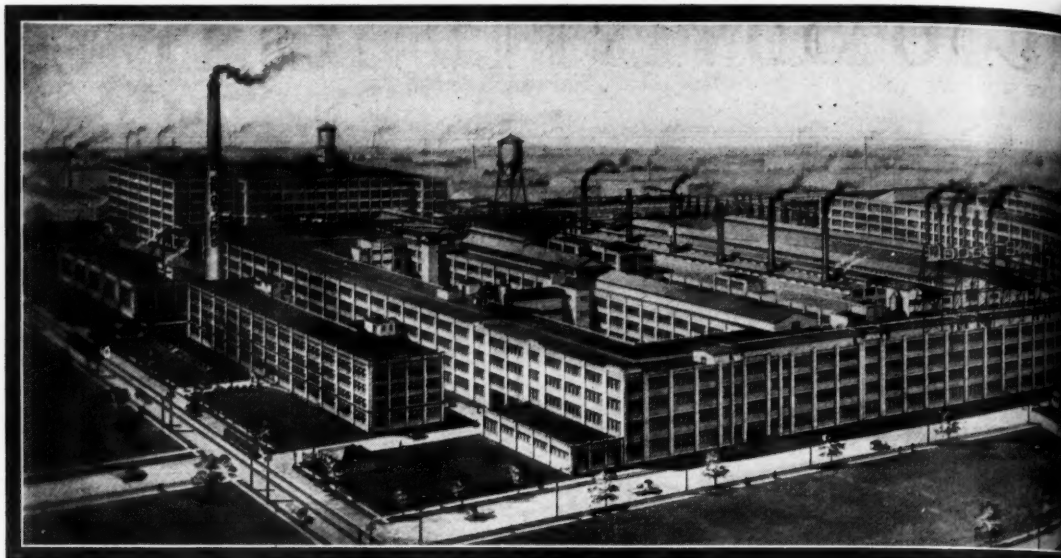
The purchase of Dodge Brothers by Dillon, Read & Co. will affect, to some degree, every automotive concern. This view is emphasized by the fact that a number of important financial houses are acting with Dillon, Read & Co. in the distribution of the securities of the new organization.

The Dodge purchase indicates that the big banking interests of the country are in full accord with the view held by practically all automotive executives—that the best days of the automobile business lie ahead. A banking firm which has handled the securities of vast corporations and kingdoms for the past quarter of a century would not be likely to invest \$150,000,000 in any industry if it did not have full confidence for the future.

Dillon, Read & Co., in buying Dodge Brothers, must be banking on the prosperity of the whole automotive industry.

NO single company, however strong and however well managed, can go ahead permanently unless the general field in which it operates is prosperous.

THIS plant is an outgrowth of the original Dodge plant erected in 1910 when Dodge brothers were building engines for Ford. The first big addition was constructed in 1914, when the Dodges started manufacture of their own car. Other additions have been built since.



The great Dodge manufacturing plant at Hamtramck, Detroit. Building

Dodge Brothers, of course, is recognized as one of the two most stable and successful single companies in the automobile business, but its progress over a period of years, like that of any producer, is dependent more or less on the advancement of the automotive industry as an industry. These facts must have been in the minds of the bankers who paid many kings' ransoms for the concern. And in that fact the automotive industry should find reason to congratulate itself and to feel more certain that the optimistic utterances of its leaders are to be borne out by future events.

What else will result from the big purchase which has just been completed? For the immediate future nothing, according to Dillon, Read & Co. The bankers say that the Dodge deal in itself is of such great proportions that there is no thought of mergers or other combinations. Dodge Bros. was bought, they say, as a complete entity, with every intention of keeping it such. It is a property of remarkable value as it stands; it needs no other companies in association with it. A merger might be to the detriment of the Dodge Company rather than to its benefit under present circumstances.

Other Factors to Consider

It would be foolish, of course, for anybody to say that no other company ever would be consolidated with the new Dodge organization. Other companies might be put on the market in such a way as to be very attractive buys and the group controlling Dodge might find it only the

part of common sense to take advantage of such conditions. But the latest definite information from Dillon, Read & Co. is that no mergers are contemplated.

Very few passenger car companies exist which have not been mentioned as possible participants in a merger with the new Dodge group. Flat denials have come from the chief executives of the companies mentioned most prominently in this connection, as well as from the new purchasers.

It is not beyond the bounds of reason to suppose that some of the names on Dame Rumor's lips have been put there with the hope of stimulating the stock of particular companies, and it wouldn't be at all surprising if Dillon, Read & Co. were offered an opportunity to purchase one or more motor car outfits. In some cases it is almost certain that "Barkus is willin'," but that is a long way from an actual merger.

Be that as it may, the immediate future of the Dodge company itself is a subject of vital interest. The new owners of the Dodge property have every intention of continuing the operating policies and management which have brought the Dodge organization to its present peak of prosperity.

"The Dodge company is one of the most successful in the world," says Clarence Dillon, head of Dillon, Read & Co. "Consequently there is every reason for continuing and no reason for changing the operating policies and personnel which have been responsible for that success. No changes are contemplated."

This statement by Mr. Dillon, together with the word sent to Dodge dealers by Frederick J. Haynes, the Dodge president, seem to assure a continuance of present ideas in management.

Mr. Haynes' statement said:

"Dillon, Read & Co. has arranged to purchase Dodge Brothers, Inc. The new owners have assured the management that the business will be continued and conducted as an independent corporation, and that any rumors of consolidation with other companies are unfounded. The policy, standards and ideals of the present organization are recognized and approved, and there is no intention of changing them. The present management and organization will remain as they are."

The fact that no changes are to be made in Dodge policies has much more significance than might be the

E. G. Wilmer

Chairman of the Board of the Goodyear Tire & Rubber Co., who acted as a representative of Mr. Dillon in the Dodge deal and who is almost certain to be on the Dodge board.





PRESENT capacity of plant, 1100 cars per day (now producing at that rate); number of employees, 18,000; value of stocks and materials normally carried, \$40,000,000. Largest drop forging and largest gear cutting plants in world are located here.

and equipment are valued at \$35,000,000. Floor space totals 135 acres

case if some other company were the one under consideration, because Dodge policies have been outlined so clearly and carried out with such continuity over a period of years that they have come to mean something very



*Clarence
Dillon*

42-year-old head of the banking house which last week acquired possession of the Dodge property in a deal involving around \$150,000,000.

definite both to the members of that organization and to the industry at large.

In view of Mr. Dillon's statement, it is reasonable to suppose that the policy of "constant improvement but no yearly models" will be continued in the future as in the past. Dodge Bros. has been a leading proponent of this system, which has gained considerable favor among other manufacturers in the last year or two. While yearly models still are the rule rather than the exception, at least five other important manufacturers have eliminated the practice of bringing out new models every year and, it is understood, others are contemplating a similar move.

Other well-known Dodge policies, which it is assumed will be continued, are:

1. Close supervision of dealer finances.
2. Careful consideration of dealers' capital and car stocks at all times and definite abstinence from overloading retailers with cars under any conditions.
3. Maintenance of parts makers' good-will through consistent fair dealing and payment of reasonable prices for materials and equipment.

4. Consistent dealer educational work along service, used car, financial and selling lines.

Current Dodge policies were summarized by Mr. Haynes a few months ago in a special interview given to **AUTOMOTIVE INDUSTRIES**. In connection with the points mentioned, Mr. Haynes said, among other things:

"We don't do anything startling out here. We haven't any unusual methods or remarkable ideas. We just try to use good common sense.

"We never take a contract away from a parts maker who has been serving us well just because some other fellow comes along and offers us the same thing for a few cents less. It doesn't pay. It's not fair to go back on a company that has been giving you good service for a number of years and with which you have built up real good-will.

"A company may get some temporary advantage for a month or so by shipping to dealers cars which they can't sell. But it doesn't mean anything. The manufacturing economies achieved through high production during the months of such shipments is more than eaten up in the ill-will and merchandising inefficiencies generated in the field.

"We exercise more supervision over our dealer finances than do most automobile companies, but the practice has resulted in very material benefits both to the dealers and to ourselves."

Clarence Dillon, now the controlling factor in Dodge affairs, has every intention of remaining a permanent



*Frederick
J.
Haynes*

President of Dodge and the man credited largely with the company's success in recent years. He remains with the new owners in his present capacity.

factor in the organization. If he himself does not take any active part in the management, his representatives undoubtedly will occupy places on the board of directors. Mr. Dillon does not contemplate sale of a controlling interest.

According to B. C. Forbes, Mr. Dillon "is the most-discussed and least-known-about investment banker in the United States. He shrinks from self-glorification. He is extremely mild and gentle of manner; nothing boisterous or domineering about him."

His control of the Dodge company, coupled with his dominance of the Goodyear Tire & Rubber Co., makes him one of the three or four outstanding financial figures in automotive affairs.

Essentially a financier, Mr. Dillon has had a wide experience in industry, having been in the iron, steel and coal business before entering the financial field. He is 42 years old, being by far the youngest of the men who hold dominating places in automobile finance.

Dillon a Native of Texas

Mr. Dillon was born in Texas and was graduated from Harvard University in 1905. He became connected with the old firm of Wm. A. Read & Co. in 1913.

Contrary to the impression given in many newspaper reports, Dillon, Read & Co. is not a young firm, if its direct history is traced back. The organization has operated under its present name, of course, only since 1921, but its pedigree runs back well past the beginning of the present century.

Back in the '80's, William A. Read went to work for Vermillie & Co., a well-known private banking firm. Mr. Read built up a bond business for this concern and later became a partner in it. In 1905 he formed Wm. A. Read & Co. As noted, Mr. Dillon became associated with this organization in 1913 and, on the death of Mr. Read in 1916, became active head of the firm. In 1921 the name was changed to Dillon, Read & Co. Associated with Mr. Dillon in the present company are Wm. A. Read, Jr., Duncan Read and sons of William A. Read.

Dillon, Read & Co. functions almost exclusively as a financing organization and has handled many security issues of tremendous volume, last year its issues amounting to more than half a billion dollars. The firm became widely known in automotive circles several years ago when it undertook the Goodyear refinancing at a time when the affairs of that organization were in a highly unsatisfactory state. It handled also the Fisk reorganization.

For many years Dillon, Read & Co. has handled all of the bond issues of the Canadian National Railways. Other important issues handled by Dillon, Read & Co. in recent years include one of the Kingdom of the Netherlands in 1922, of the Shell Union Oil Co. in 1924 and of the American & Foreign Power Co. in 1924.

Plans are now in course of preparation by the company for the marketing of a large block of the Dodge stock to the public. It is said that the offering will also include bonds. It is understood that 850,000 shares of preferred stock will be issued. This will be the first time the public has ever had an opportunity to acquire holdings in Dodge, as the stock heretofore has been closely held by the estates of the two founders.

Members of the Dodge families who will share in the proceeds of the sale of the property to the bankers are Mrs. Mathilda R. Dodge, widow of John F. Dodge, and her children; Mrs. Winifred Dodge Gray (now Mrs. Wesson Seyburn); Isabelle Cleves Dodge (now Mrs. George Sloane of New York); Frances Mathilda Dodge, Daniel George Dodge and Anna Margaret Dodge; Mrs. Anna Thomson Dodge, widow of Horace E. Dodge, and children, Horace E. Dodge, Jr., and Mrs. Delphine Dodge Cromwell of Philadelphia.

On the death of John F. Dodge, Jan. 14, 1920, his will provided that the income from his estate be divided equally among the widow and children. The will of Horace E. Dodge, who died in December, 1920, gave the use of the bulk of the estate to his widow during life and at her death it was to be divided equally between the two children. The shares of the two estates in the Dodge company were equally divided.

New Theory of Detonation

A NEW theory of the action of anti-detonating agents was propounded in a recent paper by Prof. G. L. Wendt of the Pennsylvania State College and V. F. Grimm of the Standard Oil Co. of Indiana, read before the American Chemical Society. The theory is explained as follows:

"It is well known that all flames are highly ionized, that is, they are excellent carriers of an electric current. This means that the energy released in the burning of the gas mixture serves in part to liberate electrons from the reacting molecules. The advance of electrons propelled at high velocity from the flame front undoubtedly ionize the molecules in the gaseous region just ahead of the flame.

"This ionization is tentatively regarded as the factor directly responsible for the increased acceleration of the flame. At high temperatures and high pressures, such as always obtain when detonation is excessive, the velocity of the liberated electrons is high and their energy is readily absorbed by the combustible gas.

"The rate of flame propagation therefore becomes extremely high. It is, then, the function of the anti-knock molecules or, more particularly, the lead atoms present in the commonest example of anti-knock, tetra-ethyl-lead, to attract these electrons, this forming highly charged lead ions and preventing the former ready ionization of the unburned gas."

The Authoritative Way

THERE is one sure way to reach the patient—that is through the doctor. He is the authority in all matters of health.

If he approves, you may interest the patient, but he must set his seal upon it.

There is one sure way to reach the car owner—that is, through the dealer. He is the authority on all matters automotive.

Reaching the trade through the trade press is reaching the user through his authority.

Just Among Ourselves

Mr. Ford Improves as an Advertiser

THE advertising profession several years ago was in the habit of saying, with a touch of cynicism, that there were two kinds of advertisers—regular advertisers and Henry Ford. This was during the period when paid Ford advertising in periodicals was at its lowest ebb, and when the famous Ford jokes were as thick as fleas.

It is presumed that the profession has revised its opinion of Mr. Ford as an advertiser since the recent publication by the American Newspaper Publishers' Association of the advertisers who spent the most money in newspapers during 1924. Ford Motor Co. heads the list with expenditures totaling \$2,000,000 to its credit. This was for newspaper space only, not for magazine or billboard display, of which there was plenty.

The Bathing Beauty Takes a Dive

GONE are the dainty diving girl silhouettes from the windshields and rear windows of New York automobiles. Gone also are all other posters of a similar nature designed to add a swaggerish, decorative touch to the motor vehicle. The bill was passed at the last session of the State Legislature and signed last week by Gov. Smith.

The banishment of the paper diving girl may or may not have been an act that will operate to the best interests of the public at large. Personally, we somehow regret her passing. She may have served to some extent to obscure the vision of the driver, as the legislators said. But on the other hand, she also served to indicate the cars on the road that were possibly being handled by drivers who represented a total loss from the

shoulders up, and therefore as a rather reliable guide to other motorists who had a desire to steer clear of trouble.

As a danger sign, the shapely figure will be missed.

Criticism from the Pacific Coast

MY, what a razzing we did get from several Pacific Coast distributors as a result of the article by H. H. Dunn which we published on March 12 regarding the recent freight rate fight out there. We realized when we ran the story that anything Dunn might say would be open to criticism from one side or the other, but we weren't quite prepared for some of the charges leveled at us. One irate distributor wanted to know whether we were subsidized by certain strong groups of automobile manufacturers. Another thinks the story was misleading. Another thinks that it is an excellent presentation of the case and is particularly pleased because it opened up again the subject of "handling charges" which he says have been greatly abused by Pacific Coast dealers. We don't pretend to pass judgment on the merits of the case from where we sit, but we are convinced that Dunn sincerely attempted to present the facts as he saw them.

Subsidies—Who Offers Them?

ABOUT this subsidy business—we must look awfully honest or something because in our many associations with automotive executives nobody ever has offered to pay our publication expenses even for a single month, nor tried to gain our favor by presenting us with a 7-passenger limousine (front and rear bump-

ers included), nor even offered us a block of stock at 50 per cent off the market price. It has been on our conscience that Al Reeves bought our dinner on the way home from the Chicago Show and that we got a nickel-plated cigar cutter at the Hupmobile banquet, but we hope to remove those stains soon by returning the dinner and passing the cigar cutter on to somebody who smokes cigars more regularly than we do.

California Dealers and Freight Rates

TALKING about California, though, we feel it's due for a little publicity after our dissertation about Florida last week. We talked yesterday with a prominent automotive executive who returned recently from the Pacific Coast and he convinced us that we of the effete East often have a tendency to talk about conditions on the Pacific Coast without having enough actual knowledge of just what is going on out there. California, for instance, has more cars per person than any State in the Union, he pointed out, and still automotive executives as a whole know a good deal less about details of the merchandising situation in that State than about conditions in many other areas far less important from a sales standpoint. The question of freight rates, for example, bears a very different aspect to the dealers who pay them than to those who consider the question from a more or less academic standpoint. Pacific Coast rates constitute a knotty problem and the views of the Pacific Coast dealers should have every consideration in attempting to solve it. The question is an old one, of course, but the fact that it still is a very live issue on the Coast indicates its importance.

N. G. S.

Special Body Welding Methods Cut Labor Costs to Minimum

*Heavy steel jigs used in sub-assemblies at Budd body plant.
Spot welding has almost displaced riveting except
where light part is attached to heavy one.*

By J. Edward Schipper

A PIONEER in the building of all-metal bodies recently remarked that steel body production some time may be developed to such a point that the labor cost per body will be a matter of cents instead of dollars per body, so that the percentage to be charged to labor will be so small that it almost can be left out of cost calculations.

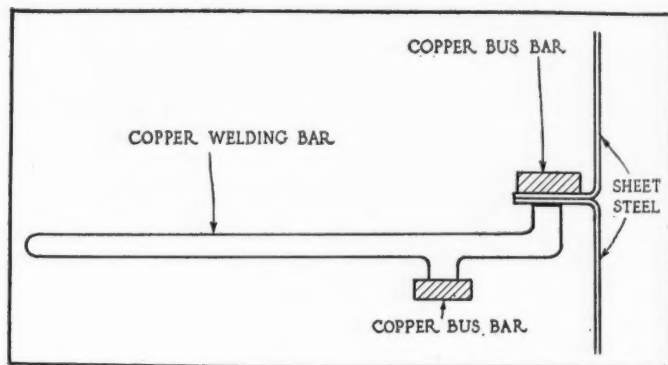
This statement presupposes runs of 2000 to 5000 bodies per day, which is by no means an impossible figure, as it is reached even now by some of the larger production companies. To realize this objective, however, it will be necessary simply to carry to a logical conclusion methods which are now in use in the production of steel closed as well as open bodies.

At the plant of the Edward G. Budd Mfg. Co. in Philadelphia, hundreds of thousands of all-steel bodies have been produced since 1912. In that time production methods have been worked out which come very close to reaching the stage of development mentioned. Development of special welding practices has played a large part in the production progress recorded.

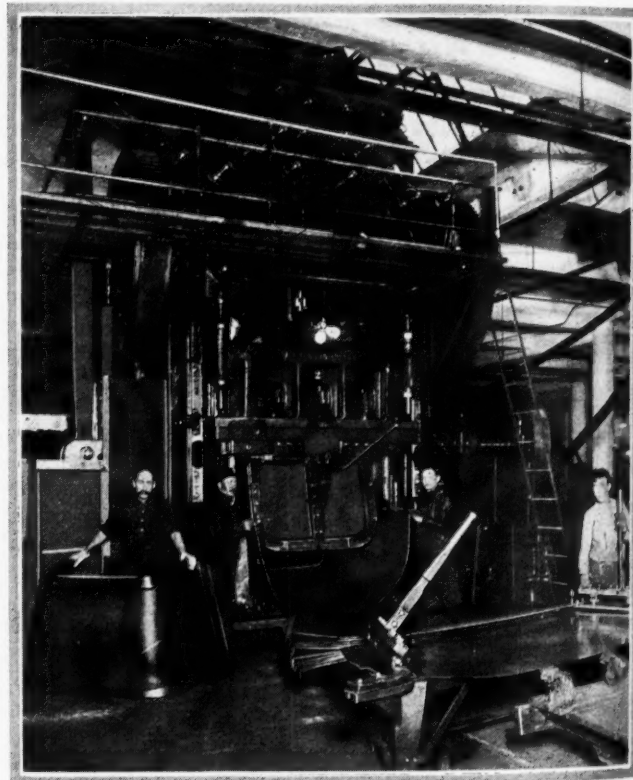
Where several pieces are put together in a sub-assembly, a miniature of the final assembly jig is employed. These smaller jigs are of heavy steel. Three methods of welding are used, depending on the nature of the part to be made, namely, spot, arc, and oxy-acetylene.

Spot and arc welding are used chiefly in lap joints and the oxy-acetylene method is employed where it is necessary to build up, as in filling a seam. After welding, the usual grinding operation is performed to leave the body at the joint just as smooth as at any other part of the plate.

Spot welding has just about displaced riveting except at points where a light part is attached to a heavy part, as, for example, when the door hinges on a sedan body are attached.



*Diagram showing use of welding bar, as a lever
between bus bars of jig*



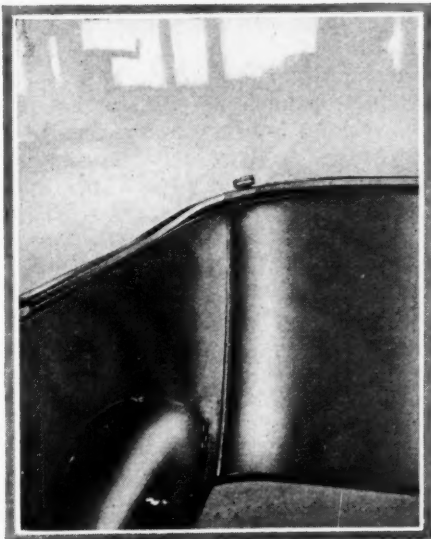
*The latest and best in press equipment is needed
in steel body manufacture. This illustration
shows one of the large Toledo presses used for
the tonneau stampings*

Small sub-assemblies pass along to larger sub-assemblies. In some as many as three hundred pieces from the press room will be fabricated into a complete body. These may be made up into twenty-five sub-assemblies, and then into five or seven larger sub-assemblies before they enter the final assembly jig. Some of the jigs, such as those for the five final sub-assemblies on sedan bodies, are quite elaborate.

Smaller sub-assemblies, however, are put together on electric tack welders, in which two sheets can be fastened together very quickly. The machines have a stationary electrode upon which the operator rests the pieces. The other electrode rises and falls on a movable arm in much the same way as a needle on a shoemaker's sewing machine. The operator passes the piece along just as if he were sewing the pieces together. The welds are perfect and made with great rapidity.

In general appearance the final assembly jigs resemble bucks used for framing composite bodies. Where the

This shows the rear and side tonneau panels on an all-steel body looking from the inside of the tonneau



Looking at this same joint from the outside of the tonneau, no welding spots are visible



latter often are made of wood, however, the final assembly jib for the all-steel body has heavy steel structure.

In addition to locating and clamping parts on this jig there are incorporated electrodes in the form of heavy copper bus bars. To make the necessary welds the operator rests his copper welding bar across one of the bus bars, and, using the bus bar as a fulcrum and the welding bar as a lever, he brings the bar against the point to be welded, at the same time forcing the surfaces together. (See Fig. 1.) The weld is almost instantaneous. A trained man can make these welds at the rate of about one per second in easily accessible points and at an almost equal rate in the less accessible points.

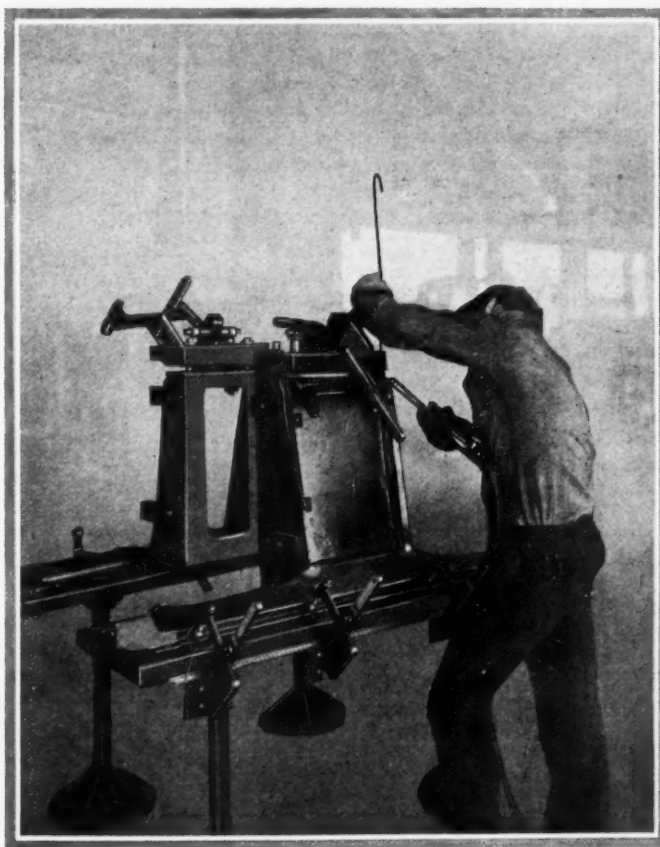
In other cases only one bus bar is fixed to the frame of the jig. The other electrode, in the form of a bar with spade-like handle, is attached to a flexible cable, while the welding end is held against the work and pressed down by the operator, the tool being held in much the same way as a pneumatic hammer.

Thus the body is welded into a substantial, rigid unit while in the jig. Lap joints are used largely, because they are convenient to weld and give greatest strength and rigidity. A strong lap joint is used at the body sills, which are of Z-section. At the top there is a U-section, which is also a lap joint.

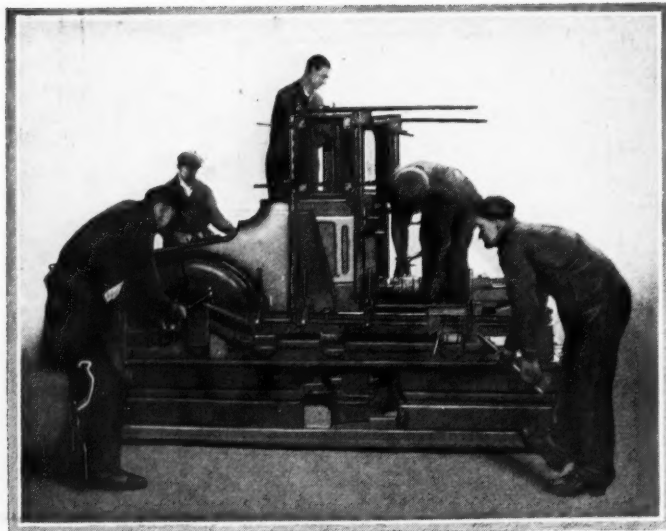
No roof is put on sedan bodies. These are applied at



The body grows from individual pieces to small assemblies put together in these little jigs. Every part is jigged into place, as extreme accuracy is a prime requisite of steel body manufacture



Following the small sub-assemblies, larger sub-assemblies are brought together in jigs such as this. The particular jig illustrated here is for the side panels and sills



The larger subassembly jigs are very elaborate. This jig takes care of the side panels, posts and sills for a coupe

the plant of the car manufacturer and are of the soft variety.

In some sedan designs the back panel is bolted to the side panels with a large number of closely spaced bolts. The beaded seam is left in the body and gives a characteristic appearance. In other and more expensive types, the seam at the back is closed by oxyacetylene welding. In this case the seams are ground off and the surface is perfectly smooth. This, of course, is the same practice as is followed in the composite body. With the exception noted, the actual tying together of the entire body is by welding.

When all welds are completed the jig is opened or

collapsed and the body removed. It is then placed on the conveyor on which the doors are hung and the necessary finishing work is performed. The doors are hung with much greater rapidity than is usual in closed body production because of accuracy in press work and care in assembly and welding. These doors all fit and practically no hand work is required.

The body then is placed in a final inspection jig. This jig resembles the final assembly jig. A dummy roof is fitted and offsets are checked to see that the body conforms to specified dimensions.

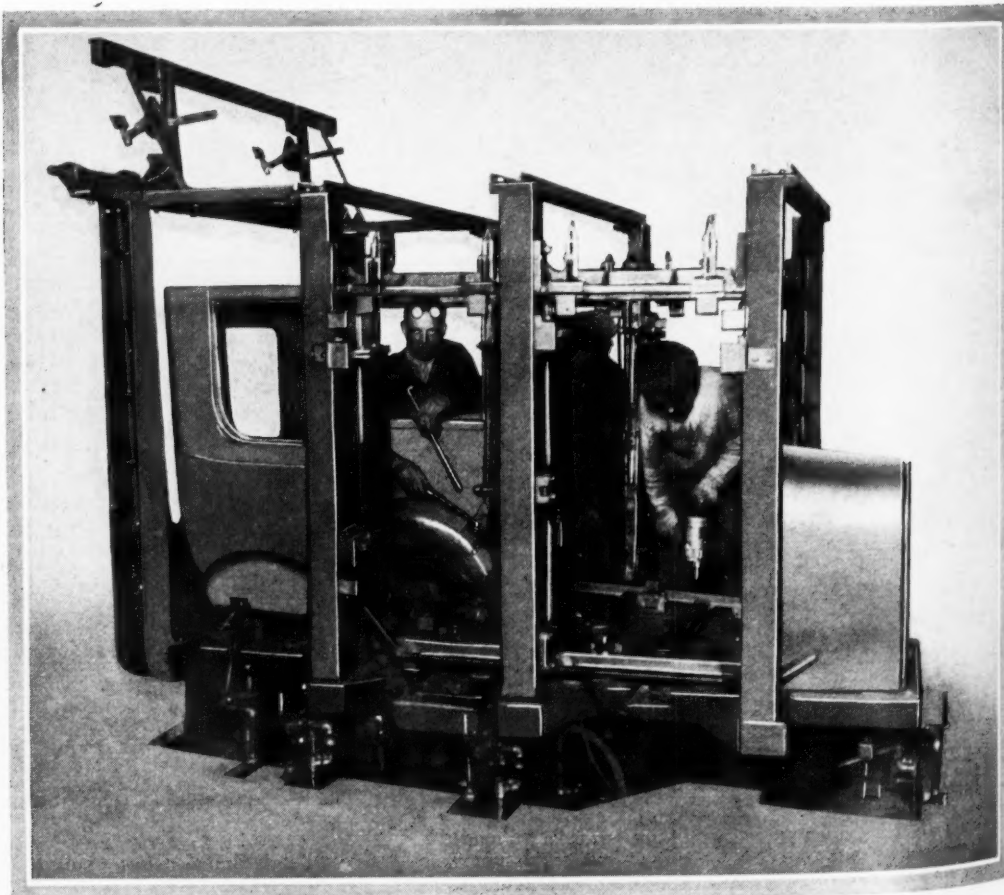
Most of the production practices are the same for the all-steel body as they are for the composite body. A sedan body comes through each final assembly jig every 11 minutes; an open body in correspondingly shorter time. The parts for the body reach the jig in four sub-assemblies, the front section, two side panels, and the back unit.

Leading up to the final assembly, as far as the steel work is concerned, the same processes used in making composite bodies are followed. It is necessary, however, on account of the joints to be made, that some of the pieces be slightly different in shape. Press work has to be of high quality and accuracy, because it is too costly to work over a piece to make it fit.

Toledo and Bliss presses with capacities as high as 1800 tons and a large number of 700 and 800 tons capacity are used.

Straight and Rotary Shearing

Straight and rotary shearing is carried out just as in composite body work, the sheets then going to the presses, where they are shaped and sent on their way to the sub-assembly departments, where the special welding machines are equipped with fixtures to insure accuracy comparable to that in machine shop practice.



The final or main assembly jig is heavy and rigid. Unlike composite body practice, where a wooden framing buck is often used, this final assembly jig is solid steel. It incorporates bus bars for the welding current as well as pilot holds for the drilling



No roof is placed on the all-steel closed body before shipping, but the roof dimensions are checked and the contour measured for accuracy with a roof line jig

Floor space per body used even now is unusually small. With the all-steel body, even under present methods, the moving from the raw material to the finished product is rapid and continuous. But little floor space for fabricated or semi-fabricated bodies is needed. After final inspection completed bodies are given an oil spray or sometimes a priming coat, which acts as a protection against rust, and then are loaded immediately into the freight car.

Problems involved in reaching the goal of minimum labor cost per body pertain largely to the design of fixtures and welding equipment in which hundreds of points can be welded simultaneously. This involves difficulties which are by no means impossible to overcome.

Ultimately bodies may be put together in a final assembly jig in which the sub-assemblies can be quickly slipped into place and, while accurately held in place by the jig, can be spot welded together, after which the jig can be collapsed and the assembled body removed, ready to be finished off and shipped to the enamel or paint shop.

Jigs are expensive, but a jig of the kind referred to here would set a new record. Besides the usual requirements of rigidity and extreme accuracy, such a jig, as matters stand today, would have to be equipped with hundreds of independent welding transformers. Each welding contact requires a separate transformer, since current passes through the path of least resistance. It has been found impossible thus far to make one transformer handle two or more welds at the same time.

Rubbing Process Is Shortened with New Car Body Finish

EASE of rubbing and ability to retain pigment content so that it will not rub off after a car body has been in service for some time are two of the important objectives which are said to have been attained in the production of Murcote lacquer, a new product announced recently by the Murphy Varnish Co., Newark, N. J.

While similar in a general way to other pyroxylin base materials, Murcote is said to give more gloss without rubbing than some other nitro-cellulose products, and to be entirely free from the orange peel effect which has characterized some of them.

Inasmuch as time and labor consumed in rubbing are an important factor in production work, the Murphy Co. determined, if possible, to make a lacquer finish which could be rubbed as quickly and easily as ordinary rubbing varnish and it is claimed that this result has been secured.

It was decided also that the practice of loading the finishing material with so much pigment that the latter will rub off easily in service should be avoided. In consequence much less pigment is employed than is used in some other lacquer finishes, although equal covering ability is claimed. This is said to be due to better "maceration" in the manufacturing process and is claimed to result also in a greater depth and brilliance in the finish. Discharge of pigment has not been entirely prevented with certain pigments which react.

It has been learned also that some pigments which are not suitable or misbehave in varnish, are relatively poor also in lacquer, while some, especially translucent ones, cause serious trouble.

Special Primer Is Used

Murcote primer, spot glaze and priming surfacer, designed especially for use under Murcote are provided. These are varnish base materials, but are somewhat differently compounded than similar Murphy products intended for use under varnish. Experiments have been made with nitro-cellulose base primers and fillers, but the Murphy Co. is not yet sufficiently satisfied with their stability under quantity production conditions to market them at present.

In production work, as in refinishing, it is necessary to see that the metal surface to be finished is chemically clean. It is recommended that it be washed with gasoline, then with Murcote cleaner and finally with alcohol. Murcote primer then is brushed or sprayed on and air dried for 24 hours or force dried for 3 to 4 hours at 175 deg. Fahr. Temperatures up to 250 deg. Fahr. can be used if desired. The primer is a red oxide with inhibitive varnish base.

When the priming coat is dry it is followed by Murcote spot glazing, applied with a knife and air dried 4 hours or force dried in 1 hour at 175 deg. Fahr., after which it may be sanded if desired. Two coats of Murcote priming surfacer then are sprayed or brushed on and each is air dried 24 hours or force dried 3 to 4 hours at 175 deg. Fahr. The second coat of surfacer should be sanded either wet or dry, preferably using a good grade of naphtha. If water is used, the surface, of course, must be dried thoroughly before succeeding coats are applied.

Japan Color as Sealer

Before applying the first of the pyroxylin coats, a coat of Japan color mixed with a small amount of Murphy's Overnight Finishing or 00 Sealer used as a binder may be used if desired. This not only acts as a sealer, but aids in bringing up a uniform color and facilitates patching in case of rubbed through spots or mars. This coat is used frequently in production. It is sprayed on and air dried 6 to 8 hours or force dried 1 hour at 175 deg. Fahr.

The body then is ready for the lacquer coats. Murcote is furnished in heavy body and is thinned with Murcote Thinner to the desired consistency, depending partly upon the color. One part thinner to three of Murcote is safest, but more thinner may be added to facilitate working.

It is recommended that at least three coats of Murcote be applied. The first and second of these can be applied one after the other without waiting for drying, but it is recommended that one hour air drying or a few minutes force drying be allowed between the first two as well as before the third coat. When the final coat is thoroughly dry and a polish is desired, it is rubbed with fine pumice or finest sandpaper and naphtha.

Wheel Rims Reduced to Comparatively Few Forms at Present Time

Forms for both the clincher and straight side tires have been standardized. Differences occur in the methods used to hold the demountable rims on the wheels

By P. M. Heldt

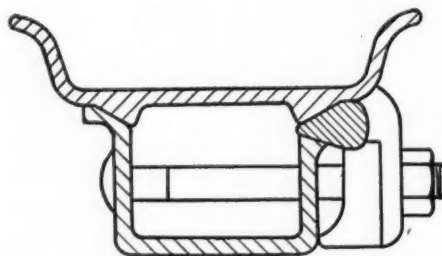
CHANGES in rim equipment are dependent somewhat upon changes in tire and wheel equipment, the rims being adapted to meet the requirements of any new form of tire or wheel that comes into use. For instance, at the present time new rim equipment is coming into use in connection with balloon tires. The fact that the rim is what might be called a dependent unit has somewhat obscured its development in the minds of most people.

In the past a great deal of inventive talent has been brought to bear on the problem of rims, and in view of the numerous types developed and patented it is rather surprising that comparatively few different types are being marketed. For a long time the tire was the most delicate part of the car, and the object of practically all the development work in connection with rims was to make it easier to remove a damaged tire from the wheel and replace it or to substitute a spare tire for it.

The first pneumatic tires used on automobiles had clincher rims, and while these had some good features, including simplicity and light weight, they left much to be desired from the standpoint of tire changing. Especially in the larger sizes it took great physical effort to remove and replace a clincher tire, and if a puncture or blow-out occurred and the owner drove on for some distance to reach his home or a service station, the whole tire usually was ruined.

As a first improvement over this type came the quick detachable clincher tire, which went onto a rim of which one flange could be removed, so that it was no longer

Firestone collapsible type rim for straight side tires on metal felloe



clincher of the rim. The term detachable had been used previously in connection with the ordinary clincher tire to distinguish it from the single tube tire, which was permanently cemented or bolted to the rim.

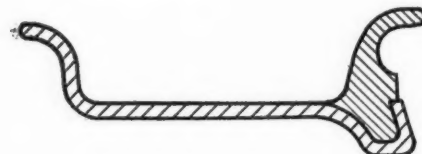
Today we have two general types of pneumatic tires, the clincher and the straight side, both of which are held against creeping by the friction of their beads or heels against the rim. This friction, of course, depends to a large

extent upon the air pressure within the tire, and in the early days, when punctures were frequent, considerable trouble was often caused by partly deflated tires creeping on their rims. This was overcome by the provision of tire lugs, by which the tire shoe was securely clamped to the rim.

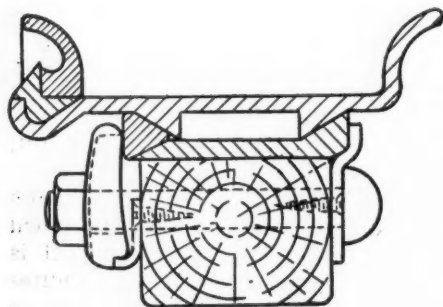
This same trouble of rim cutting led to the development of another type of tire which has now become obsolete—the mechanically attached tire. With this the edges of the shoe were held by bolts passing through the wooden felloe of the wheel.

About the time when the quick detachable type of tire made its appearance the straight side construction also came into popularity. The original form of this was the Dunlop bicycle tire developed in England and which was made also in this country under license.

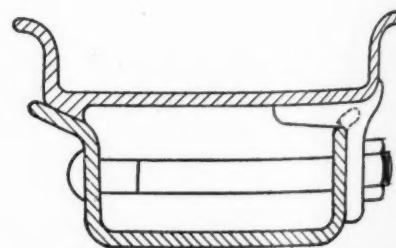
One of the characteristic differences between the clincher and the Dunlop tire was that whereas the beads or clinchers of the former were soft and extensible, being made up largely of fabric, the latter had inextensible wire cables embedded in its edges. The center portion of the rim contained a fairly deep circumferential groove, and by pushing one edge of the deflated tire into this groove at one part of the wheel circumference, the edge



Section through rim with self-locking detachable side ring



Firestone demountable rim with detachable flange and locking ring, on wood felloe



Section through Hayes rim with attached lugs on metal felloe

of the tire at the opposite part of the circumference could be forced over the edge of the rim without stretching it.

Development of the rim for the quick detachable clincher tire made it possible to use tires with inextensible edges without the drop base feature, and these came into use in 1905 and 1906. One of the next developments was a rim which would take either a clincher or a straight side tire. This was made with both flanges separate from the base. The base had a small integral flange at one side against which the tire supporting flange on that side rested, while the tire supporting flange on the other side was held in place by a split locking ring. The tire supporting flanges were of such shape that when turned one way they fitted the bead of a clincher tire, while when turned the opposite way they fitted the edge of the straight side tire. Thus a car owner was enabled to use either type of tire without change of rims.

The next step was the demountable tire, which probably came as a direct result of racing requirements. Up to this time it had been necessary, whenever a tire defect was suffered, to take the tube out of the cover and patch it or replace it by a new one. Before the car could be driven again the tire had to be inflated. This necessarily consumed considerable time, and tire trouble at that time was generally a very important factor in deciding success or failure in races. Much attention therefore was given to the problem of cutting down the delay caused by tire changes.

As a consequence the demountable rim was evolved. It had its first public try-out in the first race for the Grand Prix of the Automobile Club of France, in 1906. In one of the reports of this race a distinction was made between fixed rims and mobile rims, the term demountable evidently not having come into use as yet. This made it possible to carry one or more spare tires, fully inflated, on the car, which could be quickly substituted for a damaged tire.

A further development was the split or collapsible rim, which now largely has taken the place of the rim with a loose flange. The first of



Special
Jaxon
collapsible
rim for
Buicks



Jaxon
"25"
type of
collapsible
rim



Jaxon collapsible rim with combined driving and locking member

Two conditions which have had their influence on the development of the rim industry are, that inventors have been very active in this field and a very large number of patents on rims has been issued, and that expensive specialized machinery is required for the manufacture of rims. The business therefore cannot be conducted profitably on a small scale.

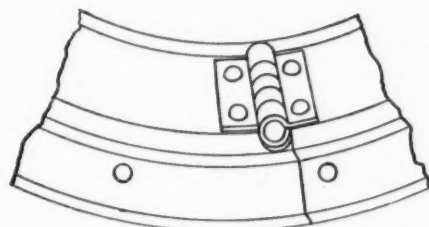
The rim business differs from the tire business in that ordinarily a much larger proportion of the business is for original equipment, a comparatively small number of rims being sold directly to the user. There is, of course, an exception to this rule when a new type of wheel or tire comes into popularity, calling for special rim equipment, as for instance, the balloon tire at the present time.

At present a very large percentage of rims used as original equipment on passenger car wheels are made by the following five members of the Tire and Rim Association:

- Firestone Steel Products Co., Canton, Ohio.
- Hayes Wheel Co., Jackson, Mich.
- Kelsey Wheel Co., Detroit, Mich.
- Jaxon Steel Products Co., Jackson, Mich.
- Cleveland Welding Co., Cleveland, O.

The Firestone Type D is a quick detachable rim made of special section steel having a combination side and locking ring held in place by spring tension. This rim is used by disk and wire wheel manufacturers in both non-demountable and demountable forms. It also is used on wood-spoked steel felloe wheels which the Firestone company has designed for balloon tire wheel equipment.

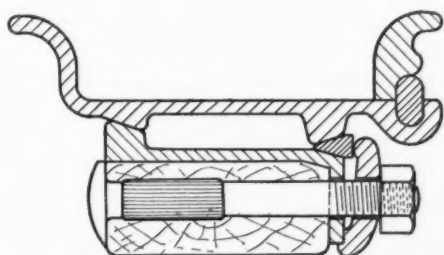
A special steel section clincher demountable rim known as Type G is made only in the 30 by 3½ in. size, for use on Ford cars. Four attaching clamps are riveted to this rim, which engage bolts in the felloe of the wheel. The Type A Firestone rim is a strip steel, straight side



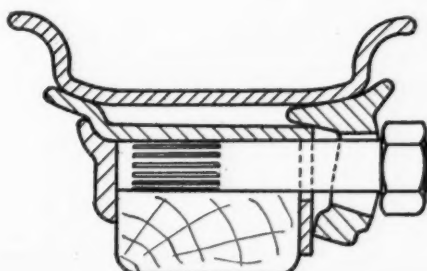
Kelsey collapsible rim with hinge type lock



Kelsey collapsible rim with wedge block type of lock and driving block



Cleveland demountable rim with detachable side ring



Cleveland demountable rim of split or collapsible type

split rim which is made in 3½ and 4 in. sections for use on light and medium weight cars. It generally is mounted on wood spoked, steel felloe wheels.

Type E is a demountable straight side split rim made of special section steel with two parallel mounting beads on the inner surface of the rim, giving a wide support for the rim on the felloe band. This rim is used in combination with the Firestone Type E steel felloe and clamping ring, which is claimed to insure correct rim alignment. It is designed for use on the heavier type passenger cars.

A quick detachable rim made from special section steel and having a high carbon side ring and locking ring is known as the Type C. This rim is used almost exclusively in the 4½ and 5 in. sizes on wood spoked, steel felloe wheels for light delivery trucks.

Another rim for Ford and other small cars is the Type M, a special steel section straight side demountable split rim made in 28 by 3½ and 30 by 3½ in. sizes. Four attaching lugs are riveted to the rim, to engage with the bolts in the wheel felloe.

Firestone Split Rims

The locking mechanism used in Firestone split rims is illustrated by one of the cuts. A locking plate is riveted to one end of the rim, the beveled edge of which extends slightly beyond the end of the rim, so that it overlaps the other end when the rim is in its normal position. The other end is provided with a swiveled eccentric locking dog. When this dog is turned to the locked position it presses the projecting portion of the locking plate firmly against the end of the rim carrying the locking dog.

In addition to the locking means the rim must be provided with driving means so it cannot creep on the wheel. Firestone now uses a driving sleeve on all models. This consists of a short length of tubing secured to the rim at the valve stem hole. The driving sleeve protects the valve stem and is claimed to be capable of withstanding great driving strains. Other makers use driving pins, plates, or lugs, while rims having attaching lugs on the side do not require any other driving means.

The Hayes Wheel Co., makes a good many sizes and designs of rim but all embody the same means for locking the split rim and for mounting the rim on the wheel. The rim locking device is very simple and comprises a locking plate which is riveted to one end of the split rim and secured to the other by a locking cap screw, the latter passing through a hole in the locking plate and screwing into the base of the rim. These split rims go into the steel felloe of the Hayes wheel. The felloe is of hollow or channel section, as shown by the sectional view, and is provided with lateral flanges to give a rigid support to the rim. Four or five attaching lugs are riveted to the rim, by means of which it is secured to the felloe, rim bolts passing through the felloe and the attaching lugs. A feature of the Hayes rim is that the attaching lugs are permanently fixed to the rim, which is claimed to keep the rims and tires in perfect alignment, to prevent squeaks and to distribute the driving strains.

Jaxon Rims

The Jaxon Steel Products Co., Jackson, Mich., makes a variety of rims starting with the plain clincher type for 30 by 3½ in. wheels. Several different locking devices for split rims are used by this firm. In one design a channel section locking bar is riveted to one end of the rim and has a slot at its other end which passes over a lug projecting inwardly from the other end of the rim. This lug has a hole in it which takes a split pin. The

flanges of the locking bar channel are for driving purposes. They are cut away at the middle of their length to form a slot to admit a bolt passing transversely through the steel felloe.

Another design is made especially for Buick cars. In this a sort of U shaped lug is riveted to one end of the rim and a swinging bar forming a hook is carried by the other, the outer part of the hook engaging into the slot of the U lug. For truck work a rim is made which has attaching lugs riveted on and which has its ends locked together by a plain locking bar riveted to one and bolted to the other end.

Kelsey Rims

One locking device used by the Kelsey Wheel Co. consists of a hinge of which the two plates are riveted to the two ends of the rim respectively. Unlocking is effected by withdrawing the hinge pin. In another design one end of the rim carries a plate with a slot with inclined sides, into which the projecting portion of a plate on the other end of the rim enters, the latter having a form corresponding to that of the slot.

The Cleveland Welding Co. uses a locking device consisting of a swinging lever, the beveled edge of which engages with the beveled edge of a locking bar secured to the other end of the rim.

Taxicabs are generally fitted with disk wheels, and as the service is very severe the rim for these wheels constituted quite a problem. To provide the necessary strength, rim makers went back to the so-called universal type of rim which was used in earlier years to take clincher and straight side tires interchangeably. The object in using this type in taxicab work is to secure the advantage of the much stiffer flanges, which are rolled separately from the rim base. This rim is shown herewith.

Darracq Wins at Miramas

DRIVING a 91½ cubic inch Darracq, from which the supercharger had been removed, Major Segrave on March 8, in France, won the 313-mile race on Miramas track at an average speed of 78.8 miles an hour. Second place was taken by Count Conelli in a similar machine. Vidal on a 122 cubic inch Grand Prix Bugatti finished third. The English jockey, Duller, was fourth in a 91½-inch Darracq, and the English amateur, Lieut. Glen Kidston, R.N., came in fifth in a 122-inch Bugatti.

This race was supposed to be for stock cars, but the only restriction was that the machines should appear on the maker's catalog. To put the different types of machines on an equality a weight limit of 1322 pounds was stipulated for 67 cubic inch machines, and this weight had to be increased by 220 pounds for each 15¼ cubic inches piston displacement above 67 inches. Miramas track measures 3 1/10 miles round, and for this race there was included a short U-shaped loop near the end of the backstretch, which could not be taken at more than 25 miles an hour. This caused brakes and gears to be brought into service each lap. Because of the regulation that this was a stock car race the Darracqs had to remove the supercharger which they have always employed in previous contests.

All the competition lay between the three Darracqs and the 122-inch Bugattis. Segrave and Kidston struggled for first place for a long time, but after quarter distance the latter was held back by lack of pressure on the gasoline line and the race was an easy win for the Darracq.

After finishing the race Vidal threw a tire on his Bugatti and overturned, with injuries to his head.

Special Equipment Widens Application Range of Milling Machines

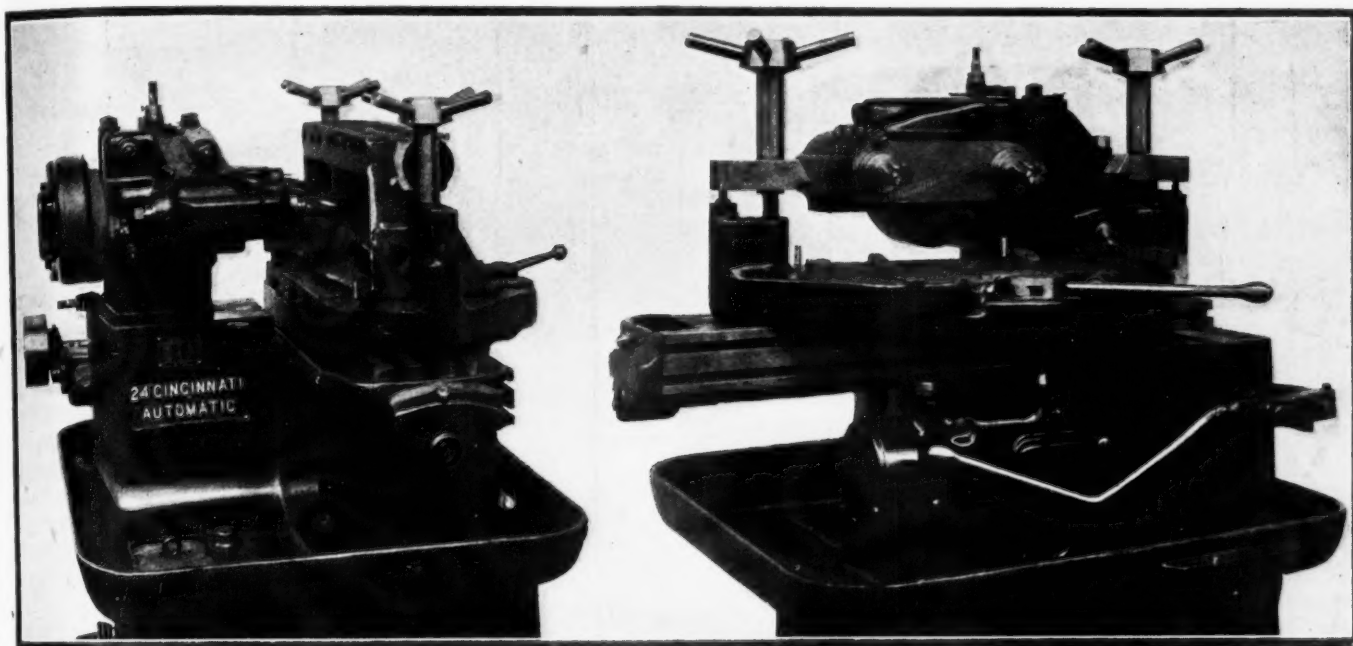


Fig. 1—Left side of machine showing cylinder casting in place in fixture before being brought to the cutting plane

Fig. 2—Further details of special two-spindle head and fixture. Five-position control lever in middle and selective stop arrangements

Milling Tappet Carrier Mounts Bosses in Cylinder Block

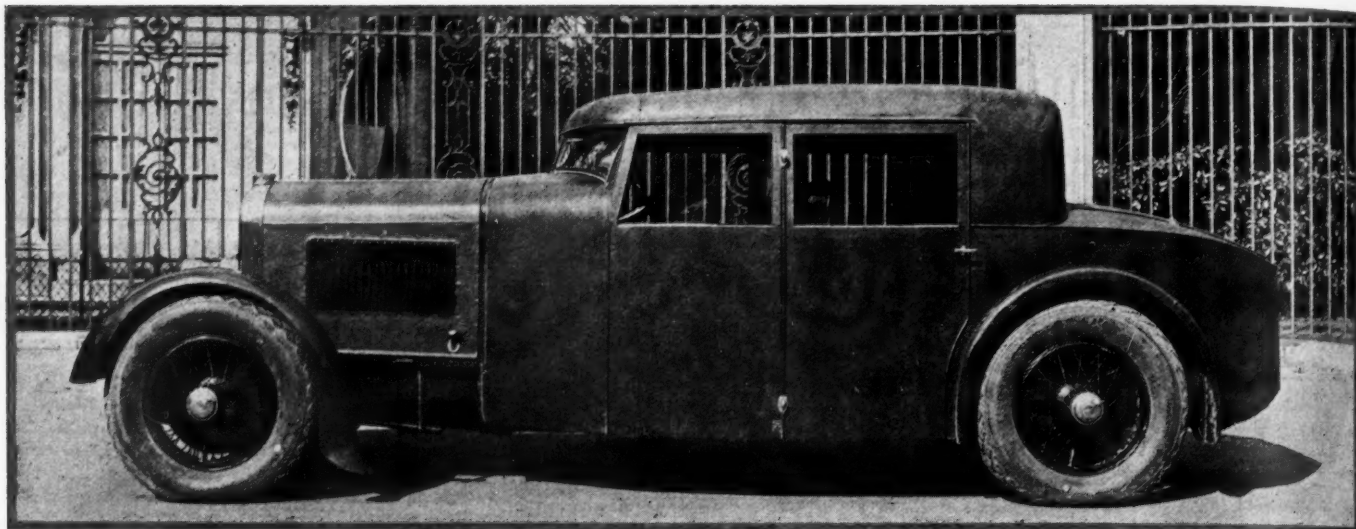
FIG. 1 illustrates an operation on a new cylinder block, performed by means of a standard 24-in. Cincinnati automatic milling machine which is equipped with a special two-spindle head and a fixture which incorporates a lever for transferring the movable portion of the base to the cutting position. The operation consists in removing $\frac{1}{8}$ -in. stock from four bosses, each pair of which serves as the mounting surface for a cluster of valve tappet guides. The four surfaces are in the same plane but below the plane of the valve housing cover joint. In order to clear the edges of the outer surface it is necessary to use cutters of small diameter; spiral end mills of $1\frac{3}{4}$ in. diameter are used and are spaced a distance equal to that between centers of the first and third or second and fourth bosses. Therefore two bosses are machined simultaneously.

As illustrated by Fig. 2, the crankcase rests on two hardened steel liners which are set into the movable table of the fixture. This table is free to move across the base of the fixture. Two short dowels determine the position of the casting on the fixture by engaging with holes already drilled. In loading, the casting is slid onto the fixture from the front. Two wedges which are set into the base as shown by Fig. 2, raise in the inner flange above the dowels and the two long pins at the back act as approximate stops. When the flange strikes these stops, it is clear of the wedges and drops onto the dowels. Clamping is effected by the heavy dogs and handscrews at each end of the base.

During the loading period, the fixture is in the center position and the cutters are clear of the valve housing flange. After the casting is clamped down and the lever

on the fixture is shifted to advance the work to the correct cutting plane, the control lever is shifted to the right and the table with the fixture moves rapidly in the same direction until a stop fixed in one of the slides on the front of the table brings the speed down to a cutting rate just before the point of cutter engagement. This speed continues until the first pair of bosses is cleaned up. Then another stop contacts and reverses the table at high speed again. This motion continues until the cutters approach the remaining pair of bosses, when another stop brings the speed down to the cutting rate. After these bosses are faced at the proper rate of feed, another stop reverses the table travel again and it proceeds at high speed back to the center position and stops for reloading. The cutter speed is 170 r.p.m. and the cutting feed is 6.4 in. per min. The entire operation is completed in 1.59 min.

In order to minimize set-up time and make the use of reground cutters possible, the outboard cutter spindle is provided with a longitudinal adjustment. Therefore, cutters may vary within any reasonable limits of length and the two cutting planes can be made to coincide. Fundamentally, the feed box control which produces this type of operation, resembles the gear shift of an automobile and is hand-controlled by a short lever with a ball joint mounting like the ordinary gear shift lever. Four gates provide selectively for rapid traverse or cutting speed in either direction. During the loading period, this lever is in the center or neutral position. To start the operation, the lever is shifted to the upper right position and requires no further attention, as the stops on the front of the table control the gear shifts until the table is brought to rest at the center position again.



Weymann's new French sports sedan body mounted on Peugeot chassis

Weymann, of Paris, Achieves Striking Design in New Sports Sedan Body

Two-door model seats five and is built over running boards to gain extreme width. Peugeot chassis of 144 in. wheelbase used. Hood as well as body covered with fabric leather. Red interior.

By W. F. Bradley

DESIGNATED a sports sedan, the latest body produced in the shops of the Weymann Automobile Body Company of Paris, has the advantages of decreased head resistance, a low center of gravity, exceptionally low weight and perfect silence. The structure embodies Weymann's distinctive feature of a wood skeleton covered with fabric leather, but differs from anything previously built in these shops by being designed specially for high-speed, long-distance travel.

Accommodation is secured for five persons by building the body outside the running boards, or, in other words, making the internal width of the body practically equal to the full width of the chassis. This gives a rear seat carrying three abreast and two independent arm chairs for the driver and the forward passenger.

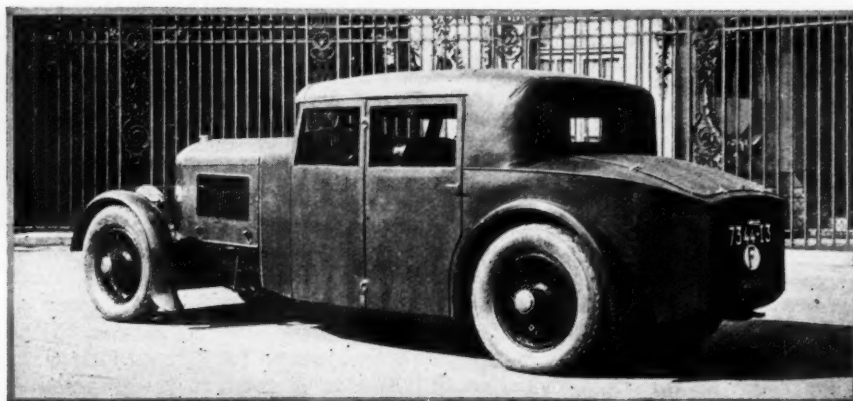
By this arrangement the rear seat can be placed ahead of the rear axle, thus giving greater comfort and a low-

er seating position. The seats are mounted directly on the chassis frame members, and the passengers' feet are carried in four wells, two being respectively to left and right of the drive shaft and two between the frame members and the side of the body, or above the running boards.

With the running boards 13 in. above the ground, the internal height is 56 in., and the total height of the body is 79 in. from the ground. The depth of the seat cushions is 8.6 in., which gives a depth of 18 in. from the top of the cushion to the floor boards.

The internal length of the body is 93 in. and greatest internal width 62 in.

The distinctive feature of the Weymann construction, namely, an ash skeleton covered with fabric leather, has been followed in this body. Practically all the timber is 1.1 in. square, and the various members assembled



A rear quarter view of the Weymann sports sedan, further illustrating the novel lines

Decreased head resistance, low center of gravity and low weight are among chief features

by steel plates with an air gap between the two pieces of wood thus joined, to prevent any possibility of squeaking.

There are three main assemblies for the body frame, the forward one comprising two vertical posts and the bowed transverse members carrying the V-shaped wind-screen. This assembly presented certain structural difficulties by reason of its independence from the dashboard. The second assembly comprises the two posts on which the doors are hung, and the third assembly the rear door posts, a transverse member to receive the roof slats and a bowed hoop inclined 45 deg. from the vertical forming the frame for the rounded back.

There is only one door on each side, this giving direct access to the rear seat and, by means of a central passageway, to the two forward seats.

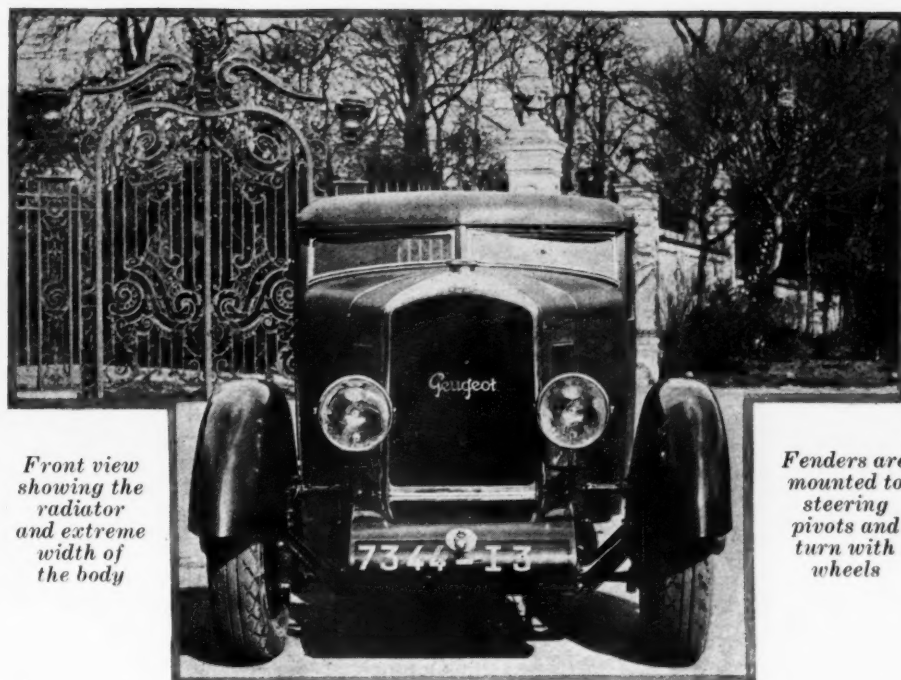
Two hinges only are used for each door. They are a new type produced by Weymann, with a conical seating.

Sliding glass panels are fitted in the false doors, while the hinged doors have frameless windows raised and lowered by chain and crank.

The tail of the car comprises a locker for the gasoline tank and a couple of spare wheels carried on a false hub above the tank.

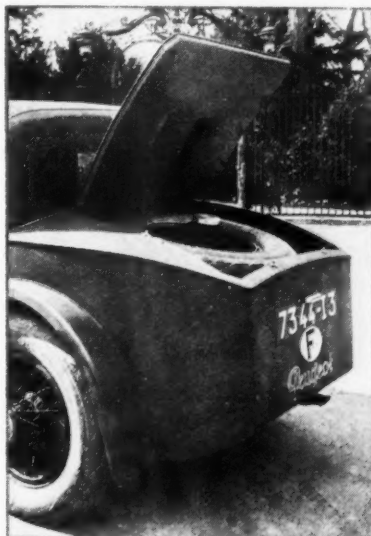
The whole of the body is covered with dark gray fabric leather without any beadings or moldings, except where necessary to make the juncture from the roof to the side panels and from the back to the tail. In these cases wood beading is used with fabric leather covering.

The hood is covered, like the rest of the body, with fabric leather, with the exception of the louvers on each side panel where the fabric is cut away and riveted

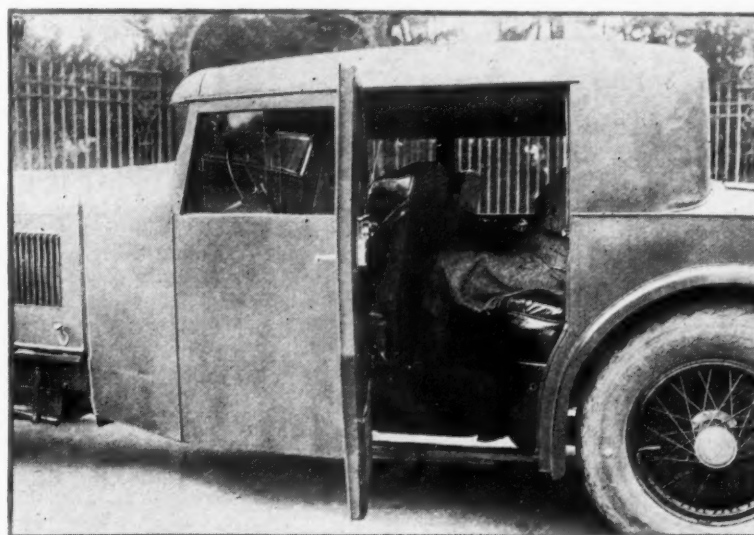


Front view showing the radiator and extreme width of the body

Fenders are mounted to steering pivots and turn with wheels



The tail provides room for the gas tank and spare wheels



The interior accommodates five passengers. The rear seat is large enough for three. In front are arm chairs for the driver and another passenger

to the aluminum. The fenders are painted to match the body and at the front they are mounted to the steering pivots and turn with the wheels.

The seats and internal panels of the body are covered with red crocodile leather. The roof is in mouse gray cloth and the running boards are rubber covered.

As the doors extend slightly below the level of the running boards, this overhanging portion is protected with

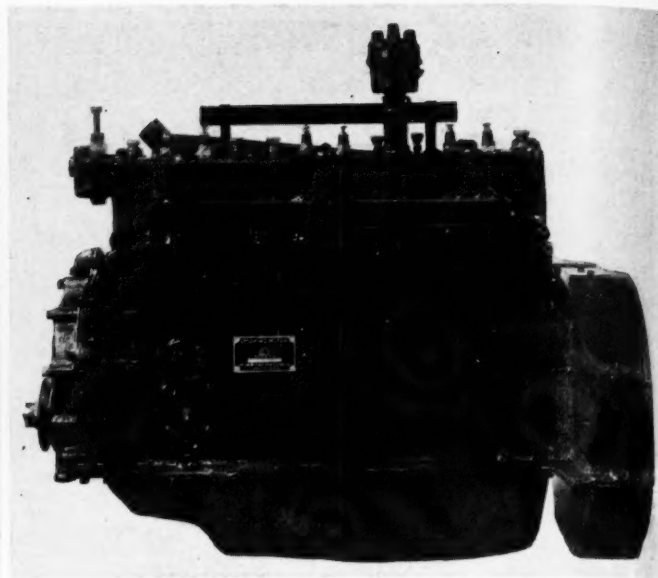
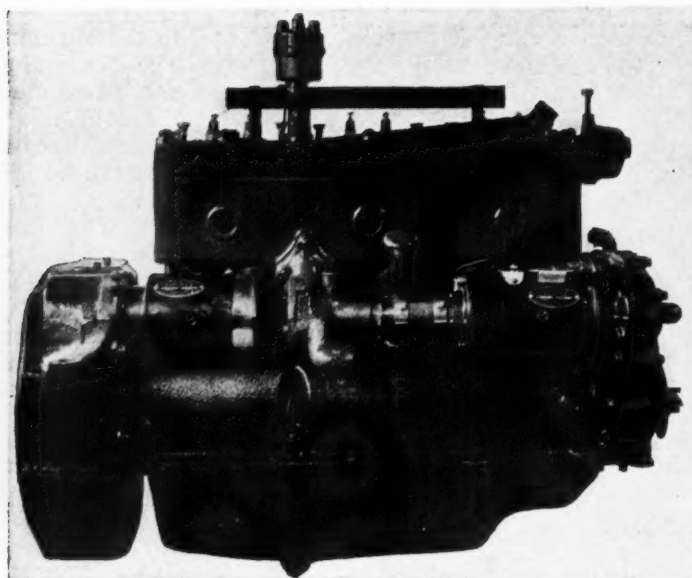
Zapon and the bottom edge of the doors is covered with a strip of aluminum.

With left-hand steering and gear shift lever in the center, the electric light switches, the ignition switch and the electric horn button have been grouped near the bottom of the gear-shift lever in such a position that the hand naturally falls on them when hanging straight down.

The chassis on which this sports sedan is built is a 25-hp. Peugeot, with four-cylinder Knight engine of 3.7 by 5.5 bore and stroke, a wheelbase of 144 in. and a track of 57 in.

M. Artault, one of the Peugeot engineers, is responsible for the general lines of the body, while Weymann developed the details and carried out the entire work.

SWITZERLAND in 1924 imported motor vehicles to the amount of 55,800,000 francs, while the exports amounted only to 5,200,000 francs. The imports from the United States amounted in value to 11,929,000 francs, or about twice as much as in the preceding year. The imports from France amounted to 19,450,000 francs and from Italy 15,277,000 francs. Thus, more than 85 per cent of the imports is supplied by France, Italy and the United States.



Right and left side views of new Lycoming six-cylinder engine

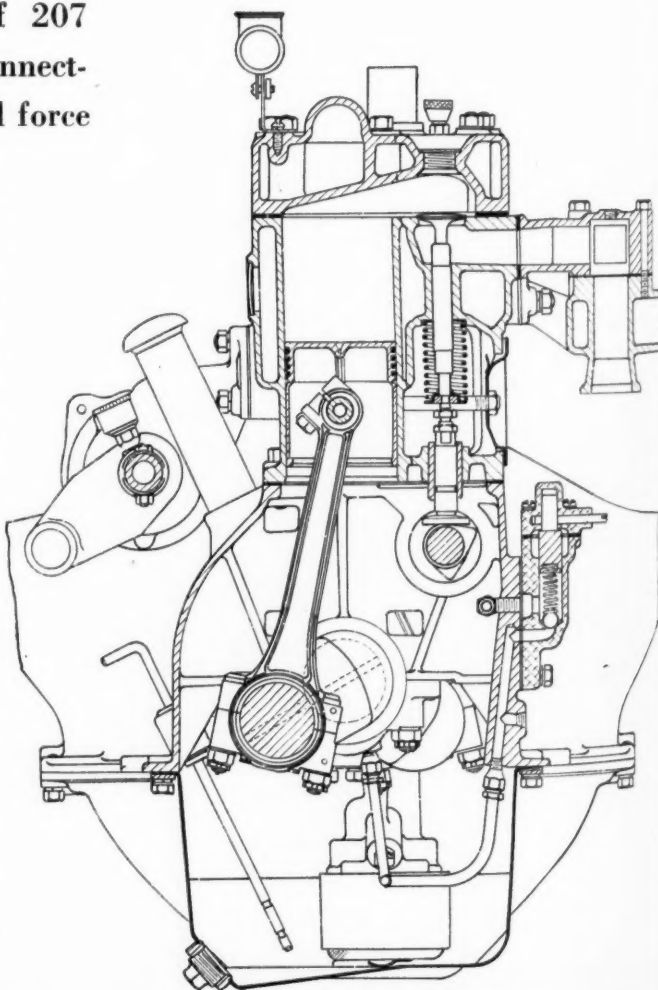
Six Cylinder Engine Latest Addition to Lycoming Line

New model has piston displacement of 207 cu. in. Develops 50 hp. at 3000 r.p.m. Connecting rod bearings are cast under centrifugal force

A SIX cylinder model has been added to the line of passenger car engines manufactured by the Lycoming Mfg. Co. of Williamsport, Pa., which now embraces four, six and eight cylinder designs. The new six has the same cylinder dimensions as the Lycoming 8-in-line, viz., $3\frac{1}{8}$ in. bore by $4\frac{1}{2}$ in. stroke, and its piston displacement is therefore 207 cu. in. The engine is of the L head type, with the cylinders cast in block, the cylinder heads detachable and the crankcase a separate iron casting which extends $2\frac{9}{16}$ in. below the crankshaft axis. Peaking at 3000 r.p.m., the engine develops a maximum of 50 hp.

The cylinder block is cast with integral jacket walls, without large openings in it. Compression chambers of conventional form, deeper over the valves than over the cylinder bore, are provided, and a compression ratio of 4.5 to 1 is used. The spark plug bosses are located directly over the inlet valves, which location is said to give the best idling characteristics. In this connection it is worth noting that the engine when mounted on a chassis of the type for which it is designed will permit of idling down to about $1\frac{1}{2}$ m.p.h. on direct drive.

Inlet and exhaust valves are not only of different materials but they are also somewhat different in size. The inlets, which are made of S. A. E. No. 3140 Steel, are $1\frac{7}{16}$ in. in diameter and have a $\frac{5}{16}$ in. lift, while the exhaust valves, which are made of silchrome, have a diameter of $1\frac{5}{16}$ in. and a lift of $\frac{5}{16}$ in. The diameters given are the clear or throat diameters. It has been found that by making the inlets somewhat larger than the exhaust valves—the available space must, of course, be divided be-



Cross section of Lycoming engine

tween the two—it is possible to get more power from the engine. Mushroom type cam followers are used, with set screw and lock nut adjustment. The clearance on both sets of valves is adjusted to 0.006-0.008 in.

Pistons are of cast iron and of light section, with ribs joining the bosses to the head. The length of the pistons is $3\frac{1}{2}$ in. and there are four $\frac{1}{8}$ in. piston rings, all above the piston pin. These rings are of the Perfect Circle type, three being plain rings and the fourth an oil-regulating ring. The piston pin which is $\frac{3}{4}$ in. in diameter, is clamped in the upper end of the connecting rod by a clamp screw passing through bosses on the split lug, and has its bearings directly in the piston bosses. The combined length of the two bearings is $1\frac{23}{32}$ in.

Four-Bearing Crankshaft

The crankshaft is of the four-bearing type, having two throws between each pair of adjacent supporting bearings. Crankpin bearings are $2\frac{1}{8}$ in. in diameter by $1\frac{1}{2}$ in. in length while all main bearings are $2\frac{3}{8}$ in. in diameter, the respective lengths being as follows: Front, 2 in.; first intermediate, $1\frac{3}{4}$ in.; second intermediate, $1\frac{15}{16}$ in.; rear, $2\frac{1}{4}$ in. The main bearings are of the conventional bronze back, babbitt lined type, but the connecting rod head bearings consist of babbitt cast directly into the head under centrifugal pressure. Connecting rod and cap are made in a single forging. An oblong hole is machined in the head. This is clamped to an aluminum face plate, with the center of the hole at the axis of rotation. The face plate is then connected to a source of power by means of an air clutch and set into rotation of the order of 1000 r.p.m. The clamping devices form a mold around

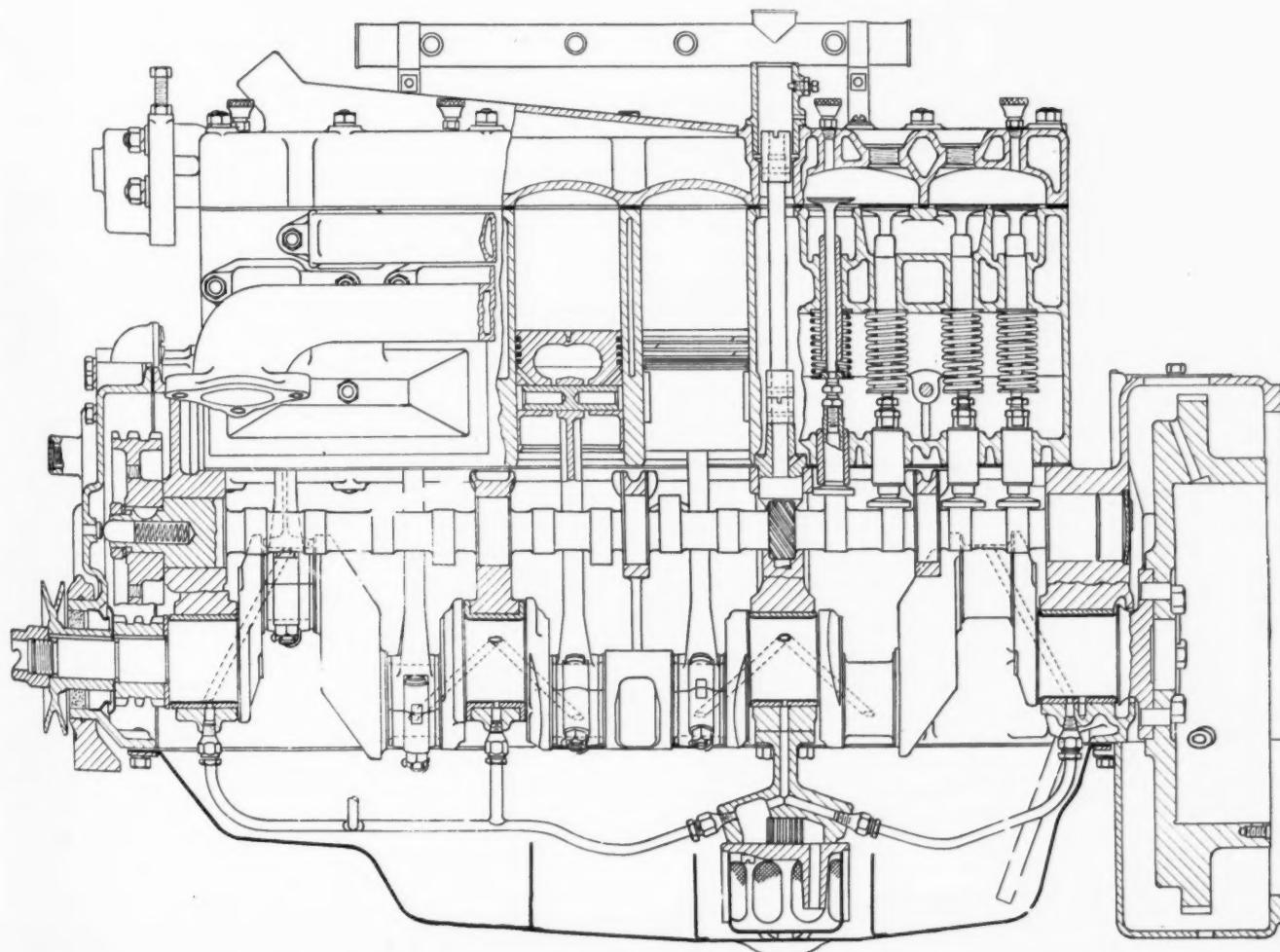
the head and babbitt is poured into this with a ladle which holds exactly the right amount. By the centrifugal force acting on it the babbitt is evenly distributed over the circumference of the oblong hole.

Connecting Rod Tinned

Before the connecting rod is placed into the babbitting fixture, it is prepared for the process by being tinned (by dipping) over the surface to which the babbitt is to adhere, and in order that the tin may not cover the whole of the big end, that end is previously given a coating of white-wash, except on the bore of the hole. After the babbitting operation, the babbitted hole is bored out to two centers, $\frac{1}{8}$ in. apart, and the cap is then milled off, $\frac{1}{8}$ in. of metal being removed by the milling cutter. This makes the hole circular and of a diameter conforming to the crankpin diameter.

The oil well is a steel stamping and is secured to the crankcase with a cork gasket between. The engine is designed for three point support on the main frame. At the forward end there is a cylindrical seat on the hub of the chain case cover which takes a trunnion to be mounted on the front cross member of the frame, while at the rear there are two arms which are designed to rest on pressed steel brackets secured to the frame and to be secured by a single bolt each.

Two methods of camshaft and accessories drive are offered, one by means of the Link-Belt automatically tensioned chain and the other by means of the conventional hand adjusted chain. A chain of $\frac{3}{8}$ in. pitch and $1\frac{1}{2}$ in. wide is used. The crankcase is provided at its forward end with a flange to which the housing for the chain is



Longitudinal section of Lycoming six cylinder engine ($3\frac{1}{8}$ in. bore by $4\frac{1}{2}$ in. stroke)

bolted. Provision is made for a No. 2 S.A.E. flange mounting for the generator, and with the manual adjustment the generator flange is provided with oblong holes or slots permitting of moving the generator away from the crankshaft axis for purposes of chain adjustment. With the automatically tensioned chain the generator mounting is similar, except that the mounting is fixed or invariable. The chain case cover is of cast iron.

Separate inlet and exhaust manifolds are used. The inlet manifold is of the Swan type, of square cross section, and is located above the exhaust, its riser passing through the exhaust so as to form a hot spot. There are three inlet ports in the cylinder casting to which the inlet manifold bolts.

Force Feed Lubrication

Lubrication is by force feed to all main bearings and to the crankpin bearings, and by splash to all other parts. A gear-type oil pump is located in the oil pan, about even with the normal oil level therein. It is bolted to the main bearing cap between cylinders Nos. 4 and 5 and is driven from the camshaft through a pair of helical gears which also serve to drive the ignition unit on top of the engine. From the pump oil is fed to all of the main bearings through copper tubing of 5/16 in. outside diameter, which fastens into the bearing caps.

The oil pressure on the bearings is controlled by means of a regulator which is mechanically connected to the throttle lever. When the throttle is in the idling position the oil pressure is limited to about 10 lb. per sq., while when the throttle is wide open the oil pressure may rise to 50 lb. per sq. in. This oil regulator is mounted on the outside of the crankcase. A spear type oil gage is provided.

The engine is designed for pump cooling and a centrifugal water pump with a 3 in. rotor is mounted at the side of the crankcase and is driven through the generator. Water enters the cylinder jacket near the rear end, between cylinders Nos. 4 and 5, and the water passages are so laid out that the cold water strikes the valves first. The water leaves the jacket at the head in the usual way. Hose pipe of 1 1/4 in. internal diameter is used for the connections between the pump and the jacket on the one hand and the pump and radiator on the other, while a 1 1/2 in. hose pipe is used for the return connection from the jacket to the radiator.

Provision for mounting an electric starter is made, the No. 1 S.A.E. flange mounting with outboard Bendix drive being used.

Fan Bracket on Cylinder Head

The fan is mounted on a bracket secured to the cylinder head by means of two studs passing through slots in the bracket, with nuts and lock washers, adjustment of the belt tension being effected by means of a set screw with lock nut, bearing against the upper stud. Fan drive is by a 5/8-in. V-belt passing over a pulley on the crankshaft.

In the design particular attention has been given to servicing features, and all parts are comparatively accessible. For instance, the location of the ignition unit on top of the engine places that part in a position where the contacts can be inspected and adjusted with ease. The cylinder block being separate from the crankcase, it is not necessary to take the whole engine out of the car when the cylinders are to be reground, for instance. Pistons and connecting rods can be withdrawn from the engine from below, and all main bearings of the crankshaft can be adjusted from below. Similarly, the flywheel can be removed from the crankshaft without taking the latter out of the engine.

A feature of some importance from the service point of view relates to the mounting of the generator. On

engines with the Link Belt self-tensioning chain the generator can be removed without interfering with the chain in any way, and on engines with the manually adjustable chain a large hand hole is provided in the chain case cover opposite the generator driving sprocket, closed by a sheet metal cover plate, so that it is not necessary to take off the chain case cover when it is desired to adjust the chain or take off the generator.

Valve Capacities Compared

A METHOD of comparing the capacities of engine valves is described by an engineer in a recent issue of *La Technique Automobile*. He had been assigned the task of finding the reason why a new design of piston valve engine was shy on power, and rigged up a testing outfit as illustrated diagrammatically below. From the inlet port of the cylinder block connection was made to an air meter through a 2-in. pipe, and from the open end of the cylinder connection was made to the inlet of a blower through a 4-in. pipe.

Close to the blower inlet was located a throttle valve by means of which the vacuum created by the blower could be varied, and directly behind the throttle was connected a vacuum gage which indicated the vacuum in the 4-in. pipe when the blower was in operation. The air meter

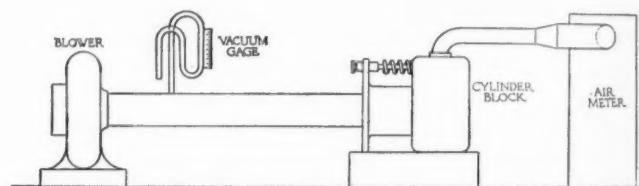


Diagram of set-up for making flow tests through engine valves

showed the rate of flow in degrees, each degree corresponding to 25 liters per minute.

Tests first were made with a poppet valve engine of the same cylinder dimensions as the piston valve engine to be studied. The inlet valve of one of the cylinders was lifted from its seat in steps of 0.064 in. and at each opening readings were taken of the rate of air flow through the valve and the cylinder under suction of 2.5 to 20 cm. of water column, varying in steps of 2.5 cm. A diagram of the valve lift curve was then laid out.

A speed of 1000 r.p.m. was then assumed, so as to get a basis for the time factor. At this speed each complete revolution of the camshaft corresponds to 1/500 minute = 60/500 = 0.12 second and each degree of cam motion corresponds to 0.12/360 = 0.000334 second. By dividing the valve opening diagram into a number of vertical strips, for which the average openings or lifts are the same as those for which observations of flow were made, it is possible, by multiplying the corresponding rate of flow by the duration of opening and then adding the results for the different strips, to get a value for the capacity of the valve, in liters per opening at 1000 r.p.m.

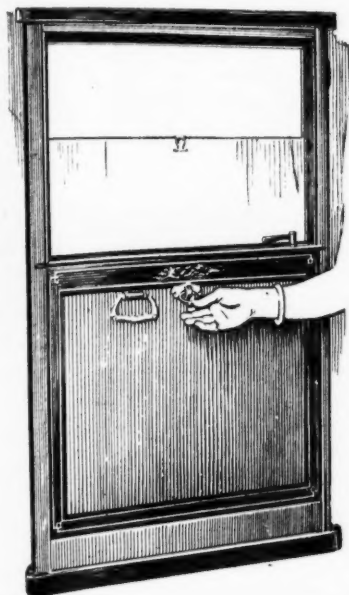
These tests and calculations are first carried through for the normal engine with poppet valves and then for the experimental engine, and the results permit a direct comparison as far as the capacities of the inlet passages and valves are concerned. In this particular case it was found that the inlet valve of the piston type was entirely inadequate for the engine, and the engine was redesigned in the light of the experimental data obtained.

This same method of experimentation can be used to advantage to study the quantitative distribution of a multi-cylinder engine.

NEW DEVELOPMENTS AND DEVICES

Improvement in Rawlins Window Lift

IN the Rawlins window lift, which was introduced here from Europe some time ago, the window is automatically lifted by the force of a coiled spring similar to the spring roller used for window shades. This window lift has been adopted by a number of makers, in-



Control device of
Rawlins window
lift

cluding Locomobile, Marmon, Flint and Sterling-Knight, as well as a number of custom body builders. An improvement has been made recently in the control.

A small ornamental metal loop, like the handle of a table drawer, hangs from the center of the car window and governs the brake control. When it is down, the window is held firmly in any position. The loop handle may be raised with little effort. This releases the brake and allows the glass window to be lowered by pulling it down. It is locked firmly in any position by merely pressing the loop handle down.

To raise the window, it is necessary only to lift the loop handle by a turn of the wrist, and the glass then automatically rises. It can be stopped at any height and held by lowering the handle.

The appearance of a car door with this window regulator and the mechanism of the regulator are shown by the accompanying illustrations.

Mercury Heavy Duty Trailer

FOR use in transportation in industrial plants the Mercury Mfg. Co. of Chicago has brought out a heavy duty trailer as shown by the accompanying illustration. It is designed to be used in a train made up of trailers and an industrial tractor, which is also manufactured by the Mercury company.

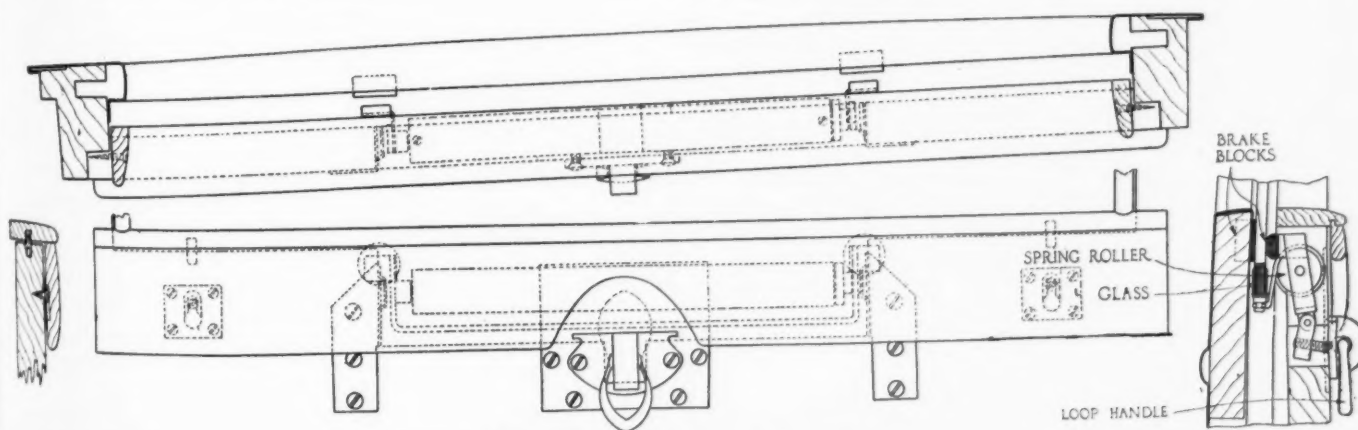
The heavy construction of the trailer is apparent from the illustration. The frame is built of T-iron and reinforced with angle iron inner sills. The hitch is made long enough for convenient manual operation. A fifth wheel is used, which consists of two cast steel plates having race-ways machined in them which are filled with seventy-eight $\frac{5}{8}$ -in. chilled steel balls. Flexible roller



Mercury heavy duty trailer

bearings are used in the wheels. Lubrication is by the Alemite system.

At both ends of the trailer platform there is a rack of piping with vertical and horizontal bracing.



Mechanism of Rawlins window lift

"The Executive"



BUSINESS, while conducted, as everyone knows, primarily for profit, also provides, especially in large corporate organizations, for the agreeable inflation of the ego.

In the theory of executive control, responsibility for a given division of the work is placed on one man, with authority, in proportionate degree, to accompany his responsibility.

This system works. In its numerous variants it functions, not only in business, but in armies, navies, churches, colleges, and Soviet Republics. Under liberal and capable administrators, while it may not be fit for Paradise, it is certainly good enough for this earth. It is orderly, flexible, and natural. Its weaknesses are mainly the weaknesses of Homo sapiens.

THE department heads are the chief vertebrae of the skeleton. In his division everything depends on the department head. He is expected to use his superior knowledge and experience for the effective conduct of his section. He must guide and inspire his subordinates, entrust each man with authority commensurate with his ability, adjust salaries equitably, and encourage his assistants to the fullest possible development of their faculties. The operations of his division must be coordinated with those of other divisions, and the ideal department head, in his relations with his compeers, knows the precise difference between helping and meddling. Finally, the entrepreneurs depend on him for counsel and support.

DEPARTMENT heads built to the above specifications exist, alas, almost exclusively in the syllabuses of business universities. They are occasionally, of course, to be found in the flesh. A large corporation is likely to contain one of them. In some enterprises they are even encouraged and their numbers multiply, although not to any alarming extent.

It is a fact that every other man in the hordes of employees is afraid of someone beneath him who aspires

to his job ahead of him. "Every other" is a conservative estimate. Through the play of these forces there arise occasionally important and lamentable divergences from the ethical concepts that generally prevail in business enterprise.

Fear, in other words, is a useful servant, but now and then it spills the beans.

IN theory every person charged with authority should give his subordinates the maximum possible freedom, for it is conceded that men do not work their best when confined in strait-jackets.

Some executives carry this theory into practice, usually with notable success. They lay out the work they want done, state their objectives succinctly, bid their subordinates go to it, and abide the outcome. If the results are unsatisfactory, and it appears that the fault is one of personnel, they fire the individuals responsible.

Successful or unsuccessful, they treat their men as adult males.

In the modest range of my own practice, I am bound to owe that I have not found executives of this type to be much moved by or concerned about fear.

DOES it not stand to reason that a man who is confident of sustaining himself is less likely to hit below the belt in a fight? He can afford to be fair and to abide by civilized rules. He can afford to give his subordinates free rein. He can admit, on occasion, that he is wrong and they are right. And for that he will be better liked and better served by those under him.

But the more timid and psychopathic administrators are incapable of letting the machinery thus run freely. With exceptional opportunities to take unto themselves the ideas and achievements of their assistants, such Yahoos get away with all they safely can, which is generally a great deal. They constantly nag, question, and persecute their subjects.

A number of more or less unconscious objectives are attained through these maneuvers. The boss nervously reassures himself of his possession

*Digested from an article by Mr. Dreher, entitled "The Psychopathology of Business," in *The American Mercury* for March.

By Carl Dreher*

of authority by constantly brandishing it.

Secondly, he derives comfort from the contemplation of his own zeal, his familiarity with details, and his firm administrative control; he feels important and seaworthy. Thirdly, he hamstrings the subordinates whose rivalry he secretly dreads.

WHEREVER such neurotics of industry hold sway, hefty sums of money, I believe, are lost—far more, probably, than can be retrieved by all the mechanical efficiency experts practicing in the forty-eight States. Aggravated cases cure themselves through the resulting malfunctioning of the department, or through a major revolt of the underlings; in one way or another, after prodigious snorting, bucking, and flinging of hoofs to the sky, the boss is unseated, discredited in the eyes of his superiors.

But when the despot himself is the only party having access to the management, many such clinics are not terminated for years. Moderately severe chronic cases, in which efficiency is merely somewhat reduced, and scrapping, petty hatreds and labor-turnover increased, usually maintain themselves indefinitely.

What holds for intra-departmental affairs is also true of interdepartmental relations. Conflicts between heads of departments are generally the result of rivalry and thirst for individual grandeur. One is often reminded in such instances of what Alexander Hamilton wrote in discussing the executive power under the Constitution:

“MEN often oppose a thing merely because they have had no agency in planning it, or because it may have been planned by those whom they dislike. But if they have been consulted and have happened to disapprove, opposition then becomes, in their estimation, an indispensable duty of self-love. They seem to think themselves bound in honor, and by all the motives of personal infallibility, to defeat the success of what has been resolved upon contrary to their sentiments. Men of upright, benevolent tempers have too many opportunities of remarking with horror to what desperate lengths this

disposition is sometimes carried, and how often . . . great interests . . . are sacrificed to the vanity, to the conceit, and to the obstinacy of individuals . . .”

However, clashes of interest are not at the bottom of all the major and minor squabbles which leave shell-holes in the terrain of industry. Some of them spring from pure juvenile aggressive tendencies, similar to those manifested in college hazing, lodge initiations, and other clowneries.

Men fight, often, for no ascertainable reason save that they get a kick out of it. They love to exert themselves, to coerce someone, to feel two-fisted, masculine. Relatively few ordinary business men outgrow this urge until they reach middle age. Some still retain it at three-score-and-ten. They fight, more or less destructively, whenever there is nothing to stop them.

THERE is opportunity for friction, especially, where two groups of men are assigned to work in concert. It is seldom that the opportunity passes unused.

Inefficient employees must be given the bum's rush. Salaries must be kept at about the market level. These measures are incumbent on an enlightened, benevolent executive on the middle levels of the industrial hierarchy. This is the moderate course, based on unheroic cogitation rather than splendid emotional urges.

I do not think that any business man with any respect for and interest in realities, as distinguished from the mountebanks of industry who juggle slogans and dizzy themselves with the phraseology of optimism, will consider this picture overdrawn. Every competent observer is familiar with it, and could supply a number of case histories.

MEN seek to rise, not by inherent merit, but by clawing down someone else, keeping him down, and vaunting themselves on their ascendancy. It is my sober belief that these dominative complexes cause more trouble in business than thieving and laziness, for they are more common, better rationalized, and unrecognized as to their anti-social character by the great mass of men.



Old Habits and Customs Greatest Obstacles to Engineering Progress

Charles F. Kettering tells Detroit Section, S. A. E., that chemistry creating essential compounds from basic elements is next big development. Civilization follows horsepower.

By W. L. Carver

THE chemistry of carbon, oxygen, hydrogen and nitrogen comprises the biggest field for engineering development.

As hydro-carbons or carbo-hydrates, in conjunction with the successive modifications which are brought about by the effect of solar or radiant energy, these elements are the foundation of human existence. However, the natural processes are sometimes slow and in some cases what appears to be the sole source of a specific combination of these elements is subject to exhaustion. Nevertheless, scientists and engineers are just beginning to appreciate the possibility of creating the essential compounds from the basic elements.

Progress is being made along these lines, although its greatest opponent is the lack of vision and imagination and the everlasting regard of the masses of population for the manners and methods of the past. In this country, a slight break in this direction is in evidence but on the whole the hide-bound regard of the individual and the mass for old habits and customs—the way in which a thing has been done in the past—is the greatest obstacle in the path of engineering and therefore economic progress.

This was the outstanding trend of thought in the recent annual talk of Charles F. Kettering, president General

“CHINA as an entity lacks imagination and cannot mold the present into the future or separate the future from the past.

“The Chinese coolie earns about 10 cents per day and if he works assiduously can accomplish a ton-mile of transportation in that time.

“Last year the average cost of haulage on our railways was $\frac{1}{2}$ cent per ton-mile. Therefore, the Chinese coolie, by comparison, gets about 20 times what he is worth.”

Motors Research Corp., before the Detroit Section of the Society of Automotive Engineers. As in the case of his former visits, his talk bore no label but journeyed around through cosmic philosophy with sidelights of chemistry, physics, economics, sociology, American advertising, Uncle Remus and the venerable Aesop, with a liberal infusion of the time-honored formula of $MV^2/2$.

In this instance, the automobile, particular field of his audience, was characterized as one of the greatest of man-

kind's development, as it opened up the field of independent transportation and is a prime mover which does not require skilled labor for its operation.

Although many of the examples and sidelights were drawn from his recent trip abroad, he stated in the beginning that he brought no message from Europe and was not particularly interested in telling what is the matter over there.

As a prelude he cited the conflict between the engineer and the banker and the latter's criticism of the former's insatiable desire to bring out new models and to modify the existing order and therefore cause new expense before the full measure of profit had been taken out of the older order. Nevertheless this is the job of the engineer and he will lose his job only when all of the forces of nature are utilized and civilization reaches its peak.

Conversion of Basic Materials

Every engineering problem is one of converting the basic materials of the earth to human needs. The more rapid the conversion, the greater is the advance of civilization. American progress is an example of this thought although many in Europe are concerned at our rapid strides and with their conception of our hectic existence, fearing that we will lose the time necessary for meditation and ultimately will arrive at the decadent condition of some of the older civilizations. This idea is the result of the lack of imagination which insists on viewing the new in the light of the past whereas American people are learning to adapt themselves to the new and modify their lives accordingly.

Ancient civilizations, including the Egyptian, Greek and Roman, reached their heights under conditions of the greatest slavery where the citizen had on the average four or five slaves, each of whom could develop about $\frac{1}{8}$ horsepower for short periods. At present the industries of this country are using about 700,000,000 horsepower, therefore each man, woman and child has available about 6 hp. or 48 mechanical slaves. Inevitably this brings greater freedom to the individual with more time to study and think and the opportunity to read newspapers and periodicals and finally to enslave more of the forces of nature.

In the place of human slavery with its maximum of $\frac{1}{8}$ hp. per unit, we are enslaving more and more of the unlimited ability of nature.

In this connection, some of the European calamity criers are worrying about the increase of population here, anticipating that with greater congestion, the possibility of individual enterprise and effort will diminish and we will arrive ultimately at the condition of China and India where the great mass of population is absorbed in earning the barest of living.

According to Mr. Kettering the answer is found in our available horsepower. If about 100,000,000 people are

thriving on the expenditure of 700,000,000 hp. and we have available, according to estimate, 13 trillion hp., the answer is fairly obvious. Along with this we are developing the imagination and susceptibility to change which will allow individual development in a measure with scientific and economic progress.

China as an entity lacks this quality of imagination and cannot mold the present into the future or separate the future from the past. The Chinese coolie earns about 10 cents per day and if he works assiduously can accomplish a ton-mile of transportation. Last year the average cost of haulage on our railways was $\frac{1}{2}$ cent per ton-mile. Therefore the Chinese coolie, by comparison, gets about 20 times what he is worth. It is the old question of basic individual effort in contrast to the utilization of the fruits of imagination.

Imagination and Progress

Lack of imagination is the greatest opponent to progress. In England the first steam railways encountered untold opposition on the grounds of ruining venerated landscapes and destroying wilful cattle. Gases and smoke were an abomination. The town of Newark, Ohio, passed an ordinance preventing the entrance of railroads with their iron demons into the corporate limits.

Some towns legislated against the bath tub as the silly custom of taking frequent baths might undermine the health of the community. High tension electric wires were prohibited, as they might come into contact with wire fences and, as all of the cattle in the neighborhood would immediately rush to this fence, a catastrophe would ensue.

Ideas of this sort are the enemies of progress and the greatest competition to research, but where a thousand musicians can play a composition only one can add a line. The engineering world must have this line in mind and keep pace with the needs of human kind.

In passing, Mr. Kettering said that the poorhouse door is one of the greatest incentives to thought. If a man is approached with a proposition while he is prosperous, you can count on his being rather hard-boiled, but let him be up against it and he immediately becomes mighty broad-minded.

Also, he commented on the unexpected results of the dole system in England. Where the originators anticipated that a small dole of about \$5 per week for the unemployed would stimulate effort toward getting another job, in actual practice the unemployed have merely studied to find ways of scaling down their living costs to this figure. The net result has been negative rather than favorable. He recommended a little American advertising for the purpose of stimulating desires above the bare essentials of life.

German Nitrate Study

The meeting took on the aspects of the classroom while he went through the German nitrate fixation development with a blackboard and chalk as equipment. As the result of the miscarriage of their pre-war plans, which forgot the French taxicabs, Germany was compelled to produce nitrates from the air and actually got into the production of about 1000 tons per day. Being anxious to retain these plants on a non-military basis after the armistice, they embarked upon the manufacture of ammonium nitrate for fertilizer and as a part of the process have developed several additional products. Among these is urea, which can be worked with formaldehyde to form a clear water-white non-brittle compound which has all of the transparency of glass and is not impervious to the ultra-violet rays. Due to the last characteristic, a new field of development is opened up. Here he digressed to the subjects of rickets and cheese-making and discussed their relationship to the latest development work.

The synthetic manufacture of sugar, with the suggestion that other hydrocarbons and carbohydrates can and will be produced from the basic elements, followed. Sugar is the product of sunlight, water and carbon dioxide. With plenty of water and carbon dioxide available and the probability of utilizing the radiant energy of the sunlight, the field is unlimited.

When gasoline runs out as regards a petroleum base, shales are available and after that cheap alcohol (if it is permissible to make such liquid). As a part of the pro-

"CULEBRA CUT was not the outstanding engineering achievement in the building of the Panama Canal.

"This cut and many other features of the canal's construction followed known lines. A previous attempt at building the canal had failed, not because of any of these things but because of the terrible effects of yellow fever.

"When Gorgas conquered the mosquito, the canal became possible. Apparently a trivial thing, but the whole project closely hinged upon this one line of work."

gram, the engineer is confronted with the problem of improving the thermal efficiency of the automobile, which is about 5 per cent at present.

All engineering is merely a question of the motion of a body from one location to another, whether it is the atom or the largest piece of construction. And all of the power used by human beings is only some form of the sunlight's reconversion. Scientists are just learning how to short-cut the process in many instances.

Too often people are prone to magnify a problem, and this applies to engineers and their research work. With this goes a tendency to get away from fundamentals. Because a doctor pronounces a disease incurable and the patient dies is no sign that the disease is incurable. It merely means that the doctor fails to understand the disease. Culebra Cut was not the outstanding engineering which made the Panama Canal. This cut and many other features of the canal's construction followed known lines. A previous attempt at building the canal had failed, not because of any of these things but because of the terrible effects of yellow fever. When Gorgas conquered the mosquito, the canal became possible. The engineering in this case and the pioneering research was the location of the effect of the mosquito, and it is one particular form of mosquito. Apparently a trivial thing, but the whole project closely hinged upon this one line of work.

In conclusion he left this thought: "At Dayton we have a motto which goes as follows: 'If you can tell us conclusively why a thing cannot be done, we can do it.'"

THE Brown & Sharpe Mfg. Co. of Providence, R. I., have brought out a new set of toolmaker's buttons which differs from the conventional set in having one long button. These buttons are used for accurately locating holes to be bored and the advantage of the one long button with the set is that it permits the use of the buttons where holes are to be located close together.



Concrete Roads Greatly Reduce Tire Wear

Study shows tire tread wear 56 times as great on poor macadam as on concrete. Consumption of fuel also 50 per cent higher on bad roads

EXPERIMENTS to determine the effect of different kinds of road surface on tire wear have been made by the Engineering Experiment Station of the State College of Washington and a preliminary report on the tests is made in Engineering Bulletin No. 16 (Relation of the Road Surface to Automobile Tire Wear). The tests were made by H. V. Carpenter, director of the station, who was assisted by H. J. Dana, H. E. Phelps, W. A. Pearl, Harry Nash and G. E. Thornton.

Some previous work on related subjects by other investigators is quoted. Thus it is stated that the Bureau of Public Roads of the U. S. Department of Agriculture found that transportation on ordinary gravel roads costs about 25 per cent more for fuel than transportation on concrete roads. The Engineering Experiment Station of Iowa State College also has made an investigation of comparative fuel costs on different types of road, the results being given in Bulletin No. 67 of that station. Some reference to these results will be made further on.

The chief object in view in the Washington tests apparently was to determine whether the saving in fuel and tire wear on good roads warrants the greater cost of these roads, or, more precisely, what amount of traffic an improved road of a given kind must carry in order that its additional cost may be compensated for by savings due to reduced fuel consumption and tire wear.

Tire wear was determined by removing the tires with their rims from the cars, cleaning them thoroughly by dry-brushing and wiping, letting out the air by taking out the valve inside and weighing on a sensitive Troemmer balance, the readings of which were accurate to $\frac{1}{2}$ gram. This latter figure, by the way, is said to be about equal to the wear in two miles on concrete road. After a test run the tires with their rims were removed from the wheels and cleaned and weighed, the same as at the beginning, the difference in weight then giving the wear. The average wear of the four tires was taken in every case.

Runs of 50 to 75 Miles

It was found that runs of 50 to 75 miles were quite sufficient to permit of making accurate determinations of the weight loss, except on concrete roads. It was also found that new tires are not satisfactory for such tests, as the sharp edges of the tread wear off rather rapidly at first; and that old tires, which have worn down to the first layer of fabric, also are not suitable, as particles of rubber are then easily detached from the tread while driving, giving the impression of excessive wear.

During any particular test the speed was kept as nearly constant as possible. Special precautions were taken to avoid running through mud holes or any other accumulations of moisture in the roadway. The need for this precaution was emphasized when a tire thus moistened near the end of the run absorbed moisture equal in weight to the wear on 12 miles of macadam. Moisture picked up early in a run is practically all lost again before the tires are next weighed.

Moisture on the tires therefore had to be carefully guarded against. For instance, if a tire were damp when weighed out it might easily lose a large part of its moisture during a run and when weighed it would show a loss in weight that would indicate a large loss of rubber. The dry summer climate of eastern Washington, together with the specially favorable weather of the summer of 1924, contributed to the success of these tests.

Temperature Affects Wear

It was found that the atmospheric temperature has a considerable effect on the rate of tire wear, and temperature measurements were therefore made during each run. Tests were run at different atmospheric temperatures at the same speed and also at different speeds at the same temperature, so as to separate the effects of these two factors. A definite relation between the atmospheric temperature and the rate of tire wear was observed. It is also known that rubber cuts much more when wet than when dry, and it was therefore reasoned that the wear of the tire would be greater in wet weather than in dry. However, no tests were made in wet weather.

In Fig. 1 are shown the rate of tire wear and the fuel consumption at different speeds over the same road. It will be noted that the rate of tire wear not only increases with increase in speed, but the rate of increase grows with the speed. Two explanations are offered to account for this phenomenon. At high speeds there is more violent impact of the tires against road obstructions, and, besides, there is more bouncing of the wheel off the roadway, followed by spinning of the wheel and grinding of the tire tread against the road surface when it returns to contact with the latter.

Most former tests to determine the relation between road speed and fuel consumption have shown that there is a speed of minimum specific consumption, which usually lies between 20 and 25 m.p.h. The Washington experiments, on the contrary, show a continuous increase in fuel consumption with increase in speed. It is stated that such a relation would be expected because of the facts that there is more loss of power at high speed from spinning of the wheels and slipping on the road, and there is also more loss from air resistance. On the other hand, a point that is not mentioned is that the gasoline engine operates at higher efficiency when carrying greater load,

as the compression is then higher, and also because the more or less constant frictional losses in the engine do not affect the efficiency so much at greater loads.

In Fig. 2 are given curves showing the relation of tire wear to both speed and atmospheric temperature. It will be noted from this that changes in temperature have a much greater effect than changes in speed. For instance, at 100 deg. Fahr. the rate of wear is about five times as great as at 40 deg. Fahr., while at 40 m.p.h. the rate of wear appears to be only about one and one-half times as great as at 10 m.p.h.

Calculations are made of the tire and fuel costs, in dollars per thousand miles, on concrete, macadam in good condition and very poor rough macadam, which indicate that the cost is about three times as great on good macadam as on concrete and eight times as great on poor macadam as on concrete.

Wear and Tear Also Lower

The figures are greatly in favor of the macadam road, especially when it is considered that savings on fuel and tires are only part of the advantages of the better road. There should also be material savings on wear and tear of the car, which would reduce both the depreciation and the repair costs. Then, better speed can be made on the better road, hence the operator's time is economized, and, finally, the danger of accident is reduced on a good, smooth road with good adherence qualities.

The tests made in Iowa showed that with a Ford touring car the fuel consumption on poor macadam ranged from 108 to 157 per cent of the consumption on concrete road. Similar results were obtained with a Dodge car, the fuel consumption on the macadam ranging from 100 per cent to 147 per cent of the consumption on the concrete road. In the Washington tests the fuel consumption on macadam roads ranged from 11 per cent of the consumption on concrete roads when the macadam road was in good condition to 151 per cent when the road was in poor condition.

From the tire wear tests the conclusion is drawn that tire treads wear off approximately 17 times as fast on good macadam as on concrete and 56 times as fast on very poor macadam.

It would seem to us, however, that these figures are likely to be misinterpreted. If any one should get the impression that the same tires would give 56 times the mileage on concrete road as on poor macadam he is likely to be disappointed. If the tread wear is greatly reduced, as it is apparently on good concrete roads, then the life of tires will be limited by other factors. Still, it is very interesting to know that tread wear is so much reduced on concrete road.

The report from which the above is abstracted is a preliminary one, covering the tests made during the summer

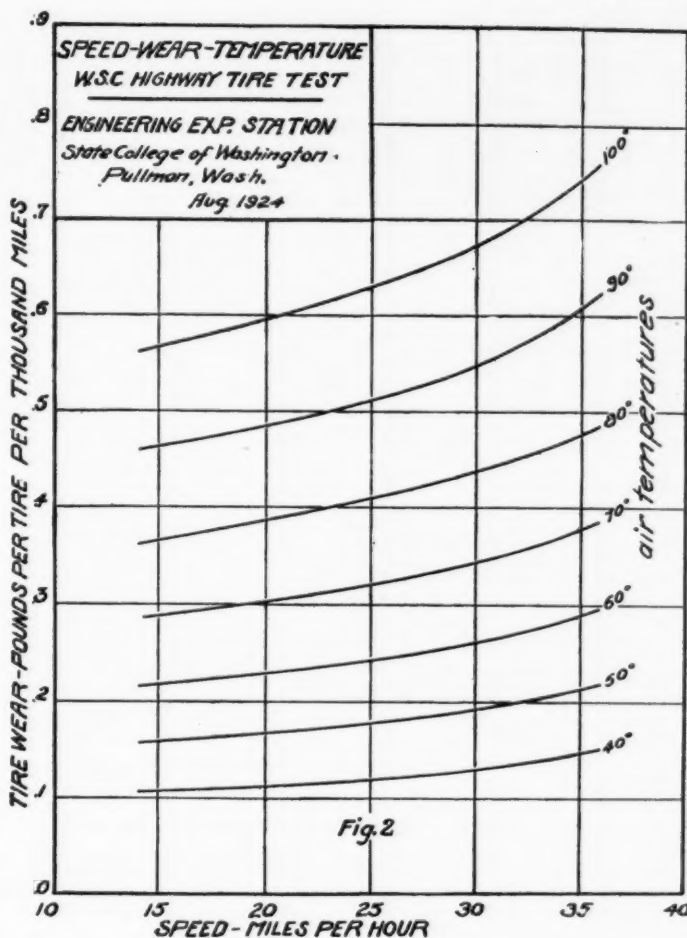


Fig. 2—Effects of speed and atmospheric temperature on tire wear

of 1924. It is stated that the tests are to be resumed as soon as conditions permit.

IN order to give the service station mechanic a quick detail picture of its product which will always be convenient for ready reference, the Chrysler Motor Corp. has started to issue large wall charts, each chart covering as clearly as possible some major unit of the car. The first chart, showing the Chrysler engine, has already made its appearance.

The idea behind the use of charts for this purpose is to furnish the information in a really usable form. Ordinarily such information is given in a manual but it was found that mechanics in dealer service stations would seldom take the trouble to refer to such instruction books. It is felt that this difficulty will be overcome by the use of charts, as they are designed for mounting behind glass on the shop wall where the mechanic can easily make use of the information without inconvenience or loss of time.

The engine chart measures 37½ in. wide by 25 in. high. At its center there is a large, partially-sectioned side view of the engine. In the space surrounding this illustration numbers of all important parts are given. Below it all the steps involved in tuning the engine are given.

In the upper left hand corner there is a sectional end view of the engine below which is listed considerable service data. On the right side there is a second sectional end view of the engine taken at another point and below it are complete valve and ignition timing instructions together with a timing diagram.

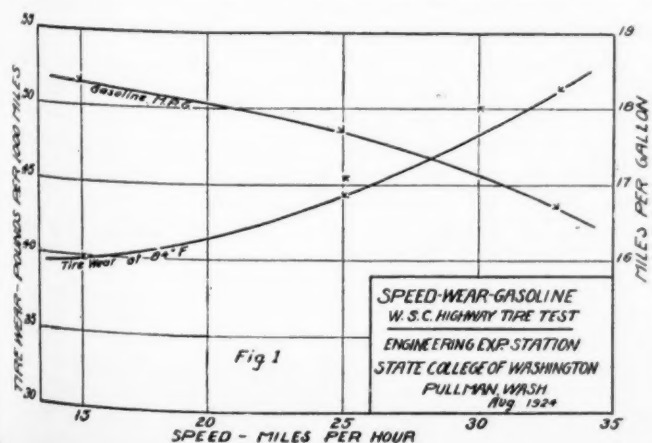


Fig. 1—Effect of speed on fuel economy and tire wear

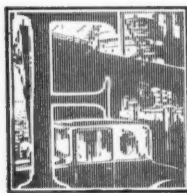


A Fordson tractor is put to work as a boat tow along one of the picturesque canals of Holland

The Automobile in Holland

Dutch are becoming motor enthusiasts. Recent Amsterdam show a great success. Future prospects for car sales are bright.

By Henry L. Geissel



FROM many standpoints the automobile show held at Amsterdam in February was the greatest in the history of Holland. Never before has the international automobile industry displayed so much interest in an exhibition in this country.

The large display hall of "Rijiel & Automobielen industrie" had to be enlarged for the event, and even then was too small to accommodate all of the manufacturers who applied for space. All of the leading firms of the world were represented.

Of automobiles there were no less than 110 different makes on the floor. In addition there were 25 types of motorcycles, 50 different makes of bicycles and 20 tire exhibits. Nearly all of the foreign manufacturers were represented by their Dutch agents, very few of them having their own branches at Amsterdam.

Many visitors commented on the fact that among all the automobiles shown there was none to represent Holland. The reason is that Holland no longer has an automobile factory. The Spijker line was discontinued some time ago as it could not compete with the foreign makes.

The future prospects for the sale of motor cars in Holland are bright. Interest in automobiles is increasing from year to year, and in spite of the high taxes, motor traffic is growing in most parts of Holland. One indication of the way the pendulum is swinging is the interest in motoring displayed by the women of the country.

A bigger field for the motorbus is also opening up. Bus traffic is increasing rapidly. There is a growing demand for trucks, heavy types in particular.

In the light car field Ford predominates. German cars are making little headway, as they are too high in price to compete with the products of other countries where the industry is on a mass production basis.

There is a considerable demand in Holland for motorcycles. The leading makes of the United States, France, England and Belgium were exhibited at the show. Many of the models were equipped with balloon tires.

In no other country of the world, perhaps, is there such an active demand for bicycles as in Holland. Almost everybody who is physically able to propel a bicycle rides. The country has 7,212,739 inhabitants and 1,744,000 "wheels," or about one bicycle to every six persons—approximately the same ratio as obtains in the United States in regard to automobiles. The German bicycles are favored chiefly by the working class and farmers. The higher-priced wheels are mostly of English or Dutch origin. The three German types exhibited at the show were the "Gorricke," "Opel" and "W K C."

A good demand for foreign tires also exists. Holland has only two small tire factories of her own.

The Dutch Government has just recently increased the import duty on automobiles from 5 to 8 per cent ad valorem. A tax of three Dutch florins per year has also been levied on bicycle owners.

EDITORIAL

Dame Rumor

DAME RUMOR always has been a popular favorite in the automotive industry. Despite her great age, she seems to have the attractions of perpetual youth. Her blandishments seem to grow in power every year.

Not for a long while has her popularity been demonstrated so strikingly as during the last ten days since Dillon, Read & Co. bought Dodge Bros. A week ago nobody could spend five minutes in Wall Street without having his head set whirling by the merger rumors with which he was bombarded. If all of the companies mentioned as likely to be merged with Dodge actually were put into combination, the result would be an organization of most astounding proportions—almost as astounding, in fact, as some of the rumors.

Picking facts out of this mêlée was no easy task—it isn't yet. But past experience should indicate clearly to the industry at large the necessity for believing only after investigation.

Adoption of Standards Abroad

STANDARDIZATION of automotive practice is being carried forward rapidly in Germany at the present time. The industry there is undergoing a process of reorganization, which was made necessary by the prospective opening of the German market to foreign competition in the near future. According to all accounts, the demand for what are referred to as utility cars is growing rapidly, but the German industry so far has devoted itself largely to luxury cars on the one hand and more or less impractical cyclecars on the other. An adjustment to the new conditions was therefore necessary, aiming at larger production and reduced cost.

Such a readjustment naturally offers a fine chance for the introduction of standards. Moreover, much is hoped for from standards as an aid in cutting production costs. Now the question has arisen whether the German industry shall adopt some of the standards which are already in use elsewhere or whether it shall evolve new standards of its own in every case.

Undoubtedly each of the two plans has something in its favor, but the great prestige which the American automobile has achieved in practically all parts of the world since the war, and the fact that the German industry must start anew in many foreign markets, are weighty factors in favor of the adoption of American standards, at least in connection with such items as directly affect the convenience of the owner.

All measurements in connection with the standards would have to be converted into metric units and in practically all cases dimensions which are simple fractions in inches would have to be expressed

in three-point decimals in the metric system. However, this should not be an objection of any consequence, as we have no difficulty in machining ball bearing mountings of nominal diameters in round millimeters in shops in which the inch is the only standard of length used.

Balloon Tires and Rim Troubles

SHIMMYING was not the only difficulty which followed in the wake of the balloon tire. There also has been a good deal of trouble with rims breaking along the line where the flange joins the base. It may be that some rim makers have been making the rims for these tires inordinately light; the large section of the tire calls for a great width of rim, and there naturally is an inclination to save weight by cutting down on the gage of the material.

The chief cause for the trouble referred to is believed to be that, owing to the low pressure carried in the tires, severe shocks due to striking large road obstacles pass right through the tire and have to be supported—to a large extent at least—by the flange of the rim. In the straight side rim made of strip the weakest point is at the corner between the flange and the base. Not only is the leverage of any shocks supported on the edge of the flange greatest at this point, but because of the cold rolling there are apt to be minute flaws in the material there, which will enlarge upon repeated bending, and finally the flange will break off.

The problem presented by the trouble described is not as complicated as that of wheel shimmy. All that is necessary to eliminate it is to provide additional material at the corner (to lessen the strain) and to form the rim while hot, so that the material will not be excessively strained in rolling and develop surface imperfections, such as minute cracks and fissures.

We understand that in the latest types of rim the corner has been properly strengthened and that with the new rims no trouble from this source need be feared.

What Constitutes "Good Will"

THE intrinsic value of an intangible quality was strikingly emphasized by the payment of approximately \$50,000,000 for the good will of Dodge, half as much as the physical assets brought. The bankers have a formula whereby "good will" is expressed by financial statements. But in the final analysis good will is merely public satisfaction and confidence, and these elements alone produce the pleasing financial statements from which the bankers form their estimates of good will value.

Our Industry Today

Keen Bidding for Dodge Property Shows Confidence of Financiers in Industry—Continued Production Gains Reported

NEW YORK, April 6—The large sum paid for Dodge Bros., Inc., and the keen competitive bidding that preceded the sale are the most significant developments of the year for the automobile industry. The transaction strikingly demonstrates the confidence placed in the future of the industry by the financial community. It is felt that car producers having passed their time of mushroom growth, are successfully working out the problems that are associated with a period when annual increases will be proportioned by the gain in wealth and population of the country.

An example of the vigor with which these problems are being attacked is the used car sales policy, just initiated by Henry Ford, which requires dealers to make a substantial gross profit on used car turnover and to guarantee the cars they sell. The effect of the policy should be to protect buyers and end the unfair competition which in the past has made the dealer's lot a hard one, to put it mildly.

Production continues to gain rapidly and appears to be considerably ahead of current sales. This is by no means an unhealthy condition, however, for the demand at the peak of the sales season should readily absorb any excess that is now being turned out at the factories. So long as dealers continue to keep their stocks low, there will be no danger of a repetition of the unfortunate situation of last year.

The price reductions that have been made effective recently by a few of the producers are a sign of the sharp competition that characterizes the industry as a whole. Every device of sound salesmanship is being employed to the utmost, for there was never a period in the history of the industry when merchandising was so powerful a factor in success as today. The price cuts do not, in most instances, seriously affect the prospect for the year's financial returns, as economies in production that were introduced last year are now being passed on to the buyer.

Nash Shows \$3,099,293 Three Month Income

NEW YORK, April 9—Nash Motors Co. reports a net income of \$3,099,293 for the three months ending Feb. 28, 1925, after all charges for depreciation and taxes. After allowing for regular dividends on the preferred stock, the company reports a balance equal to \$10.36 a share earned on the 273,000 common shares of no par value. In the same period last year net income was \$1,618,475, equal to \$4.91 a share.

Commenting on the business outlook, President C. W. Nash said "Our company has been in an oversold condition since the first of January. Notwithstanding recent additions to manufacturing facilities, we are still unable to meet demand. April orders are in excess of possible production.

Big Month Ahead in Car Production

High March Figure, Estimated
362,000, May Be Bettered by
50,000 in April

DETROIT, April 7—Shipments from factories in the first week in April show consistent increases over shipments in March, increases that at this time indicate that the industry will come very close to setting a new high production record during the present month. March with its estimated total of 362,000 cars and trucks ranks eighth in the list of the industry's high months for all time. The gain in April over March is expected to reach at least 50,000.

At the Ford plant orders from dealers indicate that April sales will reach about 175,000, with production equaling this. The total will show a gain of 10 per cent. The largest gains as a class in March production were in the vehicles retailing at \$800 to \$1,500. This same group will probably show the largest April increase. Demand for certain makes of cars has reached a point where these manufacturers have practically been compelled to cease all sales promotion work in the effort to get cars into the hands of dealers for waiting buyers.

This activity, it is expected, will be held up until July as it is regarded certain there will be no falling off in the present demand until the closing days of the present quarter at the earliest. Through sales promotional activity and dealer education work it is hoped to keep car movement at a high point through the summer and fall months also.

As an indication of the soundness of the present market and the likelihood of

its continuance through the quarter at least, manufacturers point out that the buying is general throughout the country with the best records for the early months set up in the Southern and Pacific Coast States.

As the year develops buying is becoming extensive in the Middle West and Northwest, probably the best March showings being made in these latter territories.

In April and the next months the industrial West and East are expected to vie with the agricultural districts. The soundness of the present market is the most pleasing feature to manufacturers. Practically all of the cars now being built are going direct to owners.

Owing to the measures taken by the industry to safeguard dealers there are few, if any, cars on hand—certainly not more than thirty day retail requirements with the factories' consent. Factories would gladly divert cars to other dealers if they were advised of difficulty in moving them.

If reasons were sought for the present excellent demand manufacturers advance many. Foremost is the extreme

(Continued on page 683)

Bus Chassis Planned by Studebaker Corp.

NEW YORK, April 8—Studebaker is shortly to put into production a specially designed long wheelbase chassis for bus work, according to an announcement made to stockholders by A. R. Erskine, president of the Studebaker Corp.

"The Studebaker big six 75 hp. engine," he continued, "has been found to be particularly suitable for the hard service demanded in bus service, and for this reason a number of the principal bus body builders have standardized on this power plant. More than 1000 Studebaker big six chassis, carrying special bus bodies, are in daily operation on bus lines in all parts of the country. These buses average 200 miles per day, and their average passenger mile is in excess of 10,000,000 per week."

Mr. Erskine said that March sales exceeded 14,000 cars, compared with 12,390 in March, 1924. Sales for the first quarter this year also showed a substantial increase over the first quarter of last year, and export shipments are running about 150 per cent over 1924.

In discussing the Studebaker dividend, he said that he did not believe there would be any change in the immediate future. While earnings figures for the first quarter are not complete, Mr. Erskine stated that they would be entirely satisfactory, and added that for the current or second quarter earnings would compare favorably with the record return of the second quarter of 1923.

Dodge Stock Issued

**\$160,000,000 in Bonds and Preferred Shares Offered
by Dillon, Read & Co.—Retain Control
—No Policy Change**

NEW YORK, April 9—With the announcement of the terms of the financing of Dodge Bros., Inc., by Dillon, Read & Co., and the banking group associated with it, the relation to the automobile industry as a whole of the huge operation involved in the purchase of the property is clarified.

The total amount of public financing will be \$160,000,000, of which \$75,000,000 will be in 6 per cent debenture bonds and \$85,000,000 in 7 per cent cumulative preferred stock, each share of preferred to carry as a bonus one share of common stock, the units selling at \$100. The bonds carry conversion privileges as to \$50,000,000 at prices ranging from \$30 to \$75 a share, according to the order of application.

The total issue of common stock is 2,000,000 shares, of which 1,500,000 are designated Class A. These will be issued as bonuses with the preferred and to holders of bonds who wish to convert them to stock. Voting privileges, and therefore control of the company, rests solely with the 500,000 shares of Class B common, and these will remain in the hands of Dillon, Read & Co. and their associates. The purchase price was approximately \$146,000,000.

Meanwhile the new owners have affirmed their intention of operating the Dodge company with no deviation from former policies and no changes in the operating executive personnel. Word to this effect was wired by President F. J. Haynes to the Dodge dealers, many of them are reported to have applied for stocks and bonds.

E. G. Wilmer, chairman of the board of the Goodyear Tire & Rubber Co., will be added to the directorate of the Dodge company under the new régime, but this, it is stated, will have no effect on the policies of the organization, which will continue to be directed by Mr. Haynes along the lines he has followed for some time. Whether Mr. Wilmer will be chairman of the board of the Dodge company has not yet been decided.

In his statement to dealers Mr. Haynes said:

Dillon, Read & Co. have arranged to purchase Dodge Brothers, Inc. The new owners have assured the management that the business will be continued and conducted as an independent corporation and that any rumors of consolidation with other companies are unfounded.

The policy, standards and ideals of the present organization are recognized and approved, and there is no intention of changing them. The present management and organization will remain as they are.

Figures issued by the bankers' syndicate indicate that the Dodge company is having the best year in its history. Net earnings, before deducting Federal income taxes, for the quarter ended March 31, 1925, amounted to \$6,666,454, 88 per cent greater than net income for the first quarter of 1924, and exceeded by more than 40 per cent the earnings

SALES AND EARNINGS OF DODGE BROTHERS

NEW YORK, April 8—Net income of Dodge Brothers, Inc., before deducting Federal income taxes, also the number of cars sold and the net sales for the past six years have been listed by Dillon, Read & Co. as follows:

Year	Cars Sold	Net Sales	Net Income
1919...	121,010	\$120,970,810	\$24,194,332
1920...	145,389	161,002,512	18,601,780
1921...	92,476	83,666,284	2,801,370
1922...	164,037	130,625,774	19,054,098
1923...	179,505	141,332,685	11,590,637
1924...	222,236	191,652,446	19,965,440

of the corresponding period of any other post-war year.

Net earnings for the year ended Dec. 31, 1924, before deducting Federal income taxes, were \$19,965,440. On this basis, after deducting interest on the bonds shortly to be outstanding, and income taxes at present rates, net earnings applicable to the stock were \$13,537,928, or more than 2¼ times the annual dividend requirements of \$5,950,000 on the preferred stock under the new capitalization. The indicated balance after preferred dividends is equal to \$3.80 a share on the total common stock to be outstanding. Earnings so far this year are at the rate of \$6 a share on the common.

Current assets as of April 1, 1925, are given as \$52,422,321, and current liabilities as \$16,664,993. Under the heading of current assets the item of cash and United States Government securities alone totaled over \$24,000,000.

Dodge retail deliveries during the week of March 28, 1925, gained 34 per cent over the same week in 1924, and exceeded every week but one in Dodge Brothers history. Retail orders obtained by dealers established a new high record, exceeding the same week in 1924 by 37 per cent. All sections of the United States shared in these gains, while exports have been increasing even

more rapidly than domestic sales.

Deliveries throughout the world in 1925 to date show a gain of approximately 11,800 Dodge Brothers cars and trucks over the same period of 1924. Despite the large increase in Dodge Brothers output, retail deliveries are running 100 cars a day ahead of production, and new retail orders 300 cars per day ahead of production, according to a factory statement.

An aftermath of particular interest was a statement by the General Motors
(Continued on page 683)

Ford Buys Factory on Seine Near Paris

**Expansion Programs Now in
Progress for Both French and
Australian Markets**

DETROIT, April 9—Foreign expansion of the Ford Motor Company is proceeding at an accelerated pace. A group of buildings, formerly a liquid air factory, on the banks of the Seine five miles outside Paris, have been purchased and work on an assembly plant will be started at once. The factory will be in operation by Aug. 1, at which time the Bordeaux plant will be discontinued. Ford's French production facilities will be greatly extended by the change.

It is also learned that the Ford Motor Co. of Canada will take over the sale and distribution of its products in Australia on July 1 through its subsidiary the Ford Motor Co. of Australia. On that date the five assembly plants to be operated in Australia by this subsidiary organization will be ready for manufacturing, with the possible exception of the Perth plant. The other car assembly plants will be at Sydney, Adelaide, Brisbane and Geelong, near Melbourne.

Two companies will be incorporated under the plans of the parent company. One, the Ford Motor Co. of Australia, Ltd., will be the car assembly and selling organization, the second will function solely as a body manufacturing organization, turning over its product to the car assembly company at the several points at which assembly plants are to be located.

The taking over of control of distribution and sale in Australia will be accomplished on July 1 without any disturbance of the present active market there, according to W. R. Campbell, vice-president and general manager of the parent Canadian company. The mere fact that sales control comes under company direction at this time does not imply an outstanding increase in business, but economic considerations involved will result in the market being steadily widened to the greater advantage of the company and its dealer organization.

February Sets Mark in Gas Consumption

1 Per Cent Over January and 40
Per Cent Over February, 1924
—Production at Peak Rate

WASHINGTON, April 9 — During February the manufacture of gasoline was maintained at the highest daily average production on record, 28,200,000 gallons, states the Department of the Interior in reviewing statistics compiled by the Bureau of Mines. The figure represents an increase over the daily average production for the record-breaking month of January of 1,400,000 gallons, or 5.2 per cent. Owing to the fact that February is a short month, the total gasoline production for the month, amounting to 790,441,679 gallons, fell some 41,000,000 gallons behind the high record monthly output figure set in January.

Domestic demand for gasoline during February amounted to 542,426,977 gallons, a daily average of 19,370,000 gallons and an increase over the previous month of 20,000 gallons, or 1 per cent. This also represents an increase of 40 per cent over the corresponding period of a year ago. Daily average exports of gasoline were 3,863,000 gal., an increase over the previous month of 15.3 per cent.

As in January, stocks of gasoline on hand increased in the neighborhood of 150,000,000 gallons during the month, standing at 1,487,142,423 gallons on March 1. These stocks represent 77 days' supply at the February rate of domestic demand, compared with 100 days' supply on hand a year ago, and 68 days' supply on hand a month previous.

The production of lubricants during February was 100,500,000 gallons, a daily average of 3,600,000 gallons. This represents the highest daily average production of lubricants ever recorded. Exports fell off sharply from 40,000,000 gallons in January to 27,000,000 gallons in February. Domestic demand, however, increased 43 per cent in daily average, hence stocks were increased only 6,000,000 gallons, standing at 275,000,000 gallons on March 1.

Hoffman Named Head of Studebaker Sales

NEW YORK, April 7.—The directors of the Studebaker Corp. at their meeting today elected Paul G. Hoffman as vice-president in charge of sales to succeed H. A. Biggs, resigned.

Mr. Hoffman entered the employ of the company in 1911 as a salesman in Los Angeles. In 1915 he was made sales manager of the Los Angeles retail branch, and in 1917 branch manager of the Los Angeles district.

He served in the artillery division of the army in 1917-18, and upon leaving

it in March, 1919, purchased from the corporation its retail business at Los Angeles and became a Studebaker dealer



Paul G. Hoffman

on his own account. The Paul G. Hoffman Co., starting business with \$60,000 capital, now has \$1,500,000 assets. His new headquarters will be at the general offices at South Bend, Ind. He has been elected a director of the corporation and a member of its executive and finance committees.

H. A. Biggs, who is being succeeded by Mr. Hoffman, is retiring from active business. He is compelled to establish his residence in a milder climate, and expects shortly to move from South Bend to Southern California.

DEVELOPS NEW GEAR

RACINE, WIS., April 6—Thomas L. Fawick of Racine, Wis., has perfected a new type of automobile gear, known as the Fawick speed range gear. The device is so built that it may be installed as an additional unit in any gear-driven automobile. It gives a direct drive from engine to differential and is controlled by a single lever. The Fawick Laboratories at present are completing the design, and production of a special clutch and transmission for the dirigible RS1, which the Goodyear company is building for the United States Army.

FISHER EXPANDS OUTPUT

DETROIT, April 8—Deliveries of the Fisher fast freight model of Standard Motor Truck Co. are reported by the company to have required increases in factory production facilities. Export shipments of the new model are reported as having been made to dealers in Canada, New Zealand, Australia and other countries. Melchior, Armstrong, Dessau Co., Inc., New York, has been appointed distributor for the export territory.

Tire Price Advance Declared Imminent

Big Producers Expected Soon to
Increase Lists About 15 Per
Cent—Others to Follow

NEW YORK, April 7—A general upward revision of tire prices will take place within the next two weeks, according to present indications. Several of the smaller producers, including Ajax and Lee, have made "adjustments" which really amount to a 3 to 5 per cent advance, but when the larger interests announce their new schedules it is expected that the increases will be revealed as much greater.

Manufacturers have felt for some time that higher prices were justified. Crude rubber is now selling at over 40 cents a pound, whereas last summer it was 17 cents, and meanwhile there has been practically no change in tire prices.

Schedules have been kept at the present level because two or three of the large companies have contracts with car manufacturers which they desired to protect. Now, however, it is understood that they have found a way out of this difficulty and are expected to be the first to announce advances that will probably be as high as 15 per cent. The other companies, it is thought, will quickly fall into line.

The factories at Akron are all working at top speed, and both production and sales are running well ahead of the levels at this time last year. W. O. Rutherford, president of the Rubber Association of America and vice-president of the B. F. Goodrich Co., who has just returned from a tour of the country, says that the outlook is for an exceptionally good year, though not a real boom year, for the industry as a whole. Jobbers and retailers, he declares, have in most instances avoided the danger of carrying excessive stocks in anticipation of spring business.

NAME MUSCLE SHOALS BOARD

WASHINGTON, April 2—The special commission which will investigate Muscle Shoals and draft recommendations for its disposal by the Government to Henry Ford or some other qualified lessee was announced here this week by President Coolidge.

The following were elected: Former Congressman C. Mackenzie of Illinois, former Senator Nathaniel B. Dial of South Carolina, Professor Harry A. Curtis of Yale University, William McClellan of New York City, and Russell F. Bower of the Farm Bureau Federation. Secretary of War Weeks and Secretary of Commerce Hoover, while not officially designated as members, will work with the commission, lending their advice and counsel based on the studies they already have made of the Muscle Shoals problem.

Kleiber Six Offered in Four Body Styles

Plan Two Car Daily Production
—Will Be Sold in Three
Coast States

SAN FRANCISCO, April 4—The new Kleiber, production of which started early this year at the Kleiber factory here, is a six with a wheelbase length of 122 in. It is offered in four body styles ranging in price from \$1,885 to \$2,350, which for the present will be sold only in the three Pacific Coast States. Distribution will be handled through factory branches in San Francisco, Los Angeles and Seattle and sales agencies in Fresno, Sacramento, San Diego and Portland. It is aimed ultimately to produce the new car at the rate of two cars a day.

The new car has a unit type power-plant consisting of a Continental 3½ x 4½ in. six-cylinder engine, and Brown-Lipe dry disk clutch and three-speed transmission. The starting, lighting and ignition equipment is of Delco make and the six-volt battery is a Prest-O-Lite. Timken axles are used front and rear. Semi-elliptic springs of chrome-vanadium steel are used all around, those in front being 38 x 2 in. and those in the rear 52 x 2 in. The frame side channels are 6 in. deep and have tubular members front and rear to resist weaving. The steering gear is a Ross and the universals are Spicers. Gasoline is carried in an 18-gal. tank at the rear and is fed to the carburetor by the vacuum system.

The four body styles are five-passenger phaeton, listing at \$1,885; five-passenger phaeton with California top and sliding glass side windows, at \$2,150; two-door coach seating five and priced at \$2,150, and a four-door five-passenger sedan at \$2,350. Standard equipment consists of tool kit, jack, robe rail, electric horn, windshield wiper, tire cover, bumpers and trunk rack with trunk. The bodies are built by the Fischer-Gaffney Body Co. of San Francisco and are finished in satin finish Duco. The touring car weighs 3100 lb. and the sedan 3300.

ENGLISH SHOWS ANNOUNCED

LONDON, March 30 (by mail)—An announcement of forthcoming international motor exhibitions to be held at the Olympia, Kensington, London, has been made by the Society and Motor Manufacturers and Traders, Ltd., Pall Mall, London. The following are the dates of the various exhibitions:

Cycle and Motorcycle Show—Sept. 21 to 24, 1925.
Motor Show—Oct. 8 to 17, 1925. (First day reserved for trade.)
Commercial Motor Transport Exhibition—Oct. 29 to Nov. 7, 1925.
Yacht, Boat and Marine Motor Exhibition—Nov. 23 to Dec. 5, 1925.

MINIMUM SPEED LAW URGED FOR DRIVERS

BALTIMORE, April 9—Abolition of the maximum speed limit and the substitution of a minimum speed law is being advocated by John N. Mackall, chairman of the Maryland State Roads Commission.

Congestion of traffic occurs chiefly on account of the slow-moving vehicles, in the opinion of Chairman Mackall. As a remedy to this situation he recommends that slow-moving vehicles not be allowed on certain highways during the peak hours.

Oldsmobile Production Sets Record in March

LANSING, MICH., April 7—Production and sales of Oldsmobiles during March totaled nearly three times the record for January, according to official reports from Olds Motor Works. Preparations are under way for a still greater production during the present month of April. For some time past the Olds Motor Works has been working on a system whereby production is fixed according to actual orders received. For this reason factory production and actual sales figures are on the same level.

The demand for closed cars continues strong, though this is usually the big season for open cars. The Oldsmobile coach is consistently maintaining its place as the most popular model, about 40 per cent of the entire production of the factory at this time being coaches.

BIG BUS LINE SOLD

INDIANAPOLIS, April 7—The most important sale of an independent bus company to a traction line in this territory came to light here yesterday in news of negotiations for the sale of the J. H. Bus Co., owned by A. G. Harmon, which operates from Indianapolis to Franklin and Seymour, Ind., to the Interstate Public Service Co., which operates a traction line and other utilities between here and Louisville, Ky. The traction line for several months has also been operating competing buses from here to Franklin, and lately to Seymour.

REFUSES GAS PRICE CONTROL

ATLANTA, April 7 — Fixing the price of any commodity in the open market is not within the jurisdiction of the Superior Court, Judge George L. Bell of the Fulton Superior Court declared today in denying the petition of the State of Georgia and the city of Atlanta for a permanent order injunction to prevent oil and gas companies from increasing the price of gasoline over 27 cents a gallon. The temporary injunction was forthwith dissolved.

Willys Sets Record With March Output

Retail Sales Gain 38 Per Cent
Over Same Month Last
Year

TOLEDO, April 7—With a production record of 24,300 Overland and Willys-Knight cars during the month of March, Willys-Overland has just established a new production peak, surpassing its previous record achieved a year ago in March.

Coincidentally the sales department announced that field reports show a gain in retail sales for the same month of 38 per cent compared with last year.

"Never before has the outlook for Willys-Overland appeared better," is Mr. Willys' comment supplementing the announcement of these facts. "During March we built 5200 Willys-Knight cars. We have now reached a production of 250 Overland sixes per day. Our output of Overland four-cylinder models has been nearly 600 cars per day, the majority being inclosed types, particularly the all-steel sedan, which seems to have met with generous approval by the motoring public.

Unlike the situation a year ago, which began to show diminution in business with the beginning of the second quarter, all evidence indicates that there is a steadily increasing demand for automobiles this spring, and we expect to maintain our production gait of the past month for some time to come. Our dealers are already beginning to feel the brisk demand that presages a car shortage. We are employing nearly 20,000 men at our three plants in Toledo, Pontiac and Elmira, with 14,000 men on our payroll at Toledo and 3000 each at the other two points."

Gear Advances Topic of Producers' Meeting

CLEVELAND, April 6—At the ninth annual meeting of the American Gear Manufacturers Association, which will be held at the William Penn Hotel, Pittsburgh, May 6-10 inclusive, A. H. Timmerman of the Wagner Electric Co. and president of the Electric Power Club, will present a paper on "Various Viewpoints of Standardization." This paper will be read on May 6, which has been set aside as Standards Day.

At the first general session, on Thursday, May 7, Frank Burgess of the Boston Gear Works Sales Co., Norfolk Downs, Quincy, Mass., will present a paper on "The Development of the Gear Art." On Saturday, May 9, there will be papers by Frank B. Drake, president of the Johnson Gear Co., Berkeley, Cal., on "The Gear Industry on the Pacific Coast," and by F. W. England, vice-president of the Illinois Tool Co., on "What Are the Future Possibilities of Gear Manufacturing Equipment."

M. A. M. A. Survey Shows Increased Business in 1925

Analysis Shows Sales and Profits 10 Per Cent Greater — Definite Trend Toward Selling the Trade

NEW YORK, April 9—Sales and profits will be larger in the parts and accessory industry in 1925 than they were in 1924, according to answers received from members of the Motor and Accessory Manufacturers Association to a recent questionnaire. Average opinion seemed to be that sales would be 10 per cent greater, with profits correspondingly higher. A majority of the ninety concerns which reported detailed forecasts gave the better general business and economic situation as the chief reasons for the expected increase and had improved business during the first quarter of the year to aid them in forming their opinions. Numerous companies expected a decided gain in 1925 because their distribution systems were more thoroughly organized.

Detailed reports of 1924 production by 83 companies revealed the fact that the trend during the past year has been toward sales to the trade rather than to the vehicle manufacturers. During 1924 sales to the manufacturers, as indicated by the 83 reporting companies, fell off 3.7 per cent as compared with 1923. Sales to the trade, however, showed an increase of 11.5 per cent during the same period. Total sales of these companies were 1.2 per cent below 1923 figures. About 19 per cent of the reporting companies showed a loss for 1924.

An analysis of the division of sales showed that, for those reporting, sales to car manufacturers, truck manufacturers and general jobbers all decreased during 1924, while sales to specialty and replacement jobbers showed a substantial increase.

Sales to car makers fell off 3.7 per cent, as compared to 1923; sales to truck manufacturers decreased 4.1 per cent. General jobber sales fell off 8.9 per cent, while sales to specialty and replacement jobbers increased 11.8 per cent.

Average sales per company reporting for 1924 were \$1,626,253, as against \$1,646,253 in 1923, a decrease of 1.2 per cent. Average sales per company to car and truck manufacturers fell off 3.9 per cent, while average sales per company to the trade increased 13.1 per cent.

One hundred and fifty-three members of the M. & A. M. A. reported their avenues of distribution. Eighty-four are selling both to the trade and the manufacturer, while 54 sell exclusively to the manufacturers and 15 exclusively to the trade.

NO TAX ON FIRE ENGINES

NEW YORK, April 8—The provisions of the revenue acts of 1917 and 1918, imposing a tax upon the sale by the manufacturer of automobiles and automobile trucks, do not apply to the sale of motor driven fire apparatus, according to a decision handed down by the United States Circuit Court of Appeals in the Southern District of New York.

48,306 Cars Shipped by Chevrolet in March

DETROIT, April 8—Total shipments of Chevrolet Motor Co. to dealers in March were 48,306, of which 39,906 went to dealers in the United States; 3477 to Canadian markets, and 4923 to the general export markets. This is the highest shipping mark that Chevrolet has made with the exception of October, 1923.

Shipments on March 31 set a new high total of 3097 cars for one day.

March deliveries by dealers to buyers in the United States were reported by the company to be about parallel with shipments from the factory. April shipments are expected to increase by approximately one-third over the March shipments. Reports from dealers indicate that cars can be delivered at retail in increasing amount as fast as the factory can ship them.

Cuts Announced in English Car Prices

LONDON, April 1 (by mail)—Another all-round price cut was recently announced by Fiat (England), Ltd. The new prices, compared with former listings, are as follows:

	Old	New
10 to 15 hp. chassis.....	£235	£225
Torpedo, sliding front seat....	340	280
2 or 3 seater.....	350	315
Saloon	395	375
All-Weather	410	385
3 to 4 coupe, English body....	495	470
15 to 20 hp. chassis.....	325	310
Torpedo	515	490
3 or 4 landaulet, English body.	695	660
20 to 30 hp. chassis.....	460	440
Torpedo, English body.....	720	685
3 or 4 landaulet, English body.	920	875

The Fiat commercial vehicle range has also been reduced, the 12-cwt. chassis, for instance, being cut from £270 to £235.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, April 8—Reduced activity in some lines, notably iron and steel, was reported last week. Commodity prices in general continued distinctly downward, while stock prices recovered irregularly from the previous week's decline.

Pig iron produced in March amounted to 3,522,000 tons, comparing with 3,214,143 tons in February and 3,466,086 in March last year. The average daily output was 113,613 tons, as against 114,791 in February and 111,809 a year earlier.

Car loadings in the week ended March 21 numbered 909,363, as compared with 924,149 in the preceding week and 908,390 in the corresponding period last year. Net operating income of Class 1 railroads in February amounted to \$64,910,210, representing an annual return of 4.76 per cent on investment. This figure is slightly lower than that for February, 1924, which contained an extra day.

Production of crude petroleum in the week ended March 28 declined rather sharply, averaging 1,922,600 barrels a day, as against 1,944,700 barrels in the preceding week and 1,912,400 a year ago. The rate of gasoline production in February was the highest ever attained, averaging 22,800,000 gallons a day, or 5.2 per cent above the previous high record in January.

Factory employment in New York State increased about 1 per cent last month, after a gain of 2 per cent in February. Last month's movement was very irregular, with a striking increase in automobile factories and a marked decline in woolen mills.

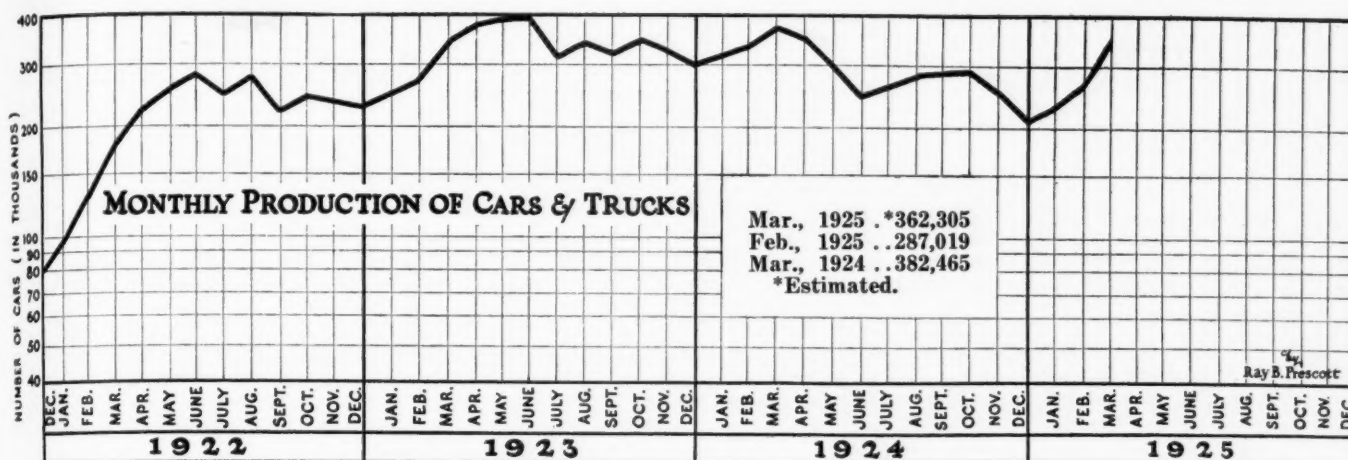
Business failures reported to Bradstreet's for March numbered 1631, showing declines of 1.2 per cent from February and 1.5 from March last year. Failures in the first three months of 1925 were 2.9 per cent more than a year ago and 3.2 per cent more than two years ago.

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended April 1 aggregated \$11,582,000,000, or 3.9 per cent above the total for the preceding week and 11 per cent above that for the corresponding period last year.

Fisher's index of wholesale commodity prices stood at 157.1 last week, comparing with 160.3 a week earlier and 162.2 two weeks earlier. Dun's monthly index shows a decline of 3 1/4 per cent, and Bradstreet's a decline of 1 per cent, in March.

Discounts by Federal Reserve banks increased \$22,300,000 during the week ended April 1, a decline of \$10,400,000 in bills secured by Government obligations being more than offset by a gain of \$32,700,000 in "other bills discounted."

MARCH PRODUCTION PLACED AT 362,305



Plans for Chicago Conference Ready

NEW YORK, April 9—"Coordinated Transportation" will be the theme of the regional Motor Transport Conference to be held under arrangements made by the National Automobile Chamber of Commerce at Chicago on Tuesday and Wednesday, May 26 and 27.

Among the speakers will be leading automobile, railroad, trolley and shipping executives from Chicago and the Middle West, and the program will be similar to that of the New England Motor Transport Conference held at Boston on Dec. 8 and 9 last.

While no geographical limits are to be placed upon attendance at the Chicago conference, special efforts are being made to obtain large representation of the various transportation facilities in Illinois, Michigan, Ohio, Indiana, Iowa, Wisconsin and Minnesota. State highways and public utilities commission officials from these States will be invited to attend and take a prominent part in the conference. Over 400 registered for the Boston conference and it is expected that this figure will be exceeded at Chicago.

Besides discussion of the place of the motor truck and motor bus in short-haul transportation, there will be statements from varying points of view upon the wisdom of Federal regulation of common carrier vehicles, a subject which has become of unusual importance since recent decisions of the U. S. Supreme Court indicating that such motor vehicles are not subject to State regulation.

How the motor truck and bus may be fitted into the solution of the city terminal problem, with special treatment of the Chicago situation, will be another subject. It is expected that results of the highway traffic survey of Cook County recently made under the supervision of the U. S. Bureau of Public Roads will be announced.

The conference will be built around the report of Committee IV. of the U. S. Chamber of Commerce upon "The Regulation of Highway Transportation to

Other Transportation Agencies." The conclusion reached by this committee was that there need not be wasteful competition between transportation facilities provided each facility is used in the field to which it has demonstrated an economic right to life.

G. M. Research Corp. to Move to Detroit

NEW YORK, April 9—The General Motors Research Corp. of Dayton, Ohio, will be moved to the General Motors laboratories connected with the General Motors Building in Detroit as soon as arrangements can be completed, it was revealed today by Alfred P. Sloan, Jr., president of General Motors Corp.

Several factors combined to bring about the move. Foremost is the opening of the new General Motors proving grounds at Milford, Mich., 35 miles north of Detroit. Most of the work on new cars is being done there, and in the large garage and workshop adjoining the proving grounds. Another object is to provide closer coordination of the research corporation's activity with the engineering and research departments of the car and truck divisions of General Motors.

An important part of the research corporation's work ended with the conclusion of experiments leading to the discovery of tetra-ethyl lead. The only work that is being done at Dayton that cannot be handled readily at Milford or in the laboratories at Detroit is the foundry department, and this, it is expected, will be combined with a foundry in one of the company's factories.

STROMBERG PROFITS

NEW YORK, April 9—The Stromberg Carburetor Co. of America, Inc., reports net profits of \$561,797 for 1924, equivalent to \$7.02 a share on the 80,000 shares of no par value. This compares with \$871,475, or \$11.62 a share on the 75,000 shares in 1923.

March Output Shows 27 Per Cent Increase

NEW YORK, April 9—Production of motor cars and trucks in March totaled 362,305, according to preliminary figures issued by the National Automobile Chamber of Commerce. These figures, based on car and ship loadings and driveaways, represent an increase of 27 per cent over the revised total for February, which was 287,019 cars and trucks.

The indicated March total is about 5 per cent under March of last year, when production was 382,465 cars and trucks. But the monthly gain so far this year has been much more rapid than last. March, '24, marked a gain of only 5 per cent over February of that year.

Prizes Announced in 1925 Safety Control

NEW YORK, April 9—Winners of the 1925 national safety contest, held annually by the National Automobile Chamber of Commerce in cooperation with the Highway Education Board, have just been announced. It is estimated that half a million school children and 60,000 teachers participated.

In the teachers' contest for the best lesson in safety, Mrs. Myrtle A. Roe, Sterling, Col., won first prize—\$500 and a trip to Washington. Mrs. Edith B. Whitney, Virginia, Minn., was second, winning \$300; and Miss Hazel Leland, Burlington, Vt., third, winning \$200. In the national elementary school contest, Francis B. French, St. Mary's School, Elizabeth, N. J., was first, and is rewarded with a gold watch and a trip to Washington to meet the President. Second and third were Miss Marion MacArthur, Sheboygan, Mich., and Miss Lucia Peques, Mount Pleasant, S. C., both winning gold watches.

The winner of the National Grange contest was Elwood Ayres, Bullville, N. Y., and he will also be taken on the Washington trip. Over 450 local prizes went to school children.

Chemists Consider Automotive Topics

Papers at Meeting of American Chemical Society of Interest to Engineers

BALTIMORE, April 8—Many subjects of great interest to those engaged in the automobile industry and its branches were discussed in this city this week when the sixty-ninth meeting of the American Chemical Society was held. A wide range of subjects was discussed at the divisional meetings of the various branches.

On the opening day of the convention Thomas Midgely, Jr., of the General Motors Research Corp., presented a paper before the division of industrial and engineering chemistry on "Poison Hazards in the Manufacture and Use of Tetraethyl Lead." Mr. Midgely said that the "hazards involved in tetraethyl lead had been found to be limited to the manufacture and handling of the concentrated material."

Many Petroleum Papers

The division of petroleum chemistry received a large number of papers. Among these were the following: A. E. Flowers, F. H. McBERTY and Ronald Reamer: "Deterioration and Reclamation of Automobile Crankcase Oil"; J. E. Babb: "Lubricating Greases, Their Composition, Properties and Application"; Reston Stevenson and Herbert J. Stark: "Equilibrium Vaporization of Gasoline"; W. B. Dillingham and E. Emmet Reid: "The Sulfur Compounds in Gasoline"; B. T. Brooks: "The Detonation of Liquid Chlorine and Gasoline Mixtures"; Cecil E. Boord and Raymond E. Schaad: "Further Studies on the Effect of Anti-Knock and Knock Inducing Substances upon the Hot-Wire Ignition of Certain Gas-Fuel Mixtures"; H. S. Davis: "A New Method and Apparatus for Measuring the Vapor Tension of Gasoline and Other Liquids"; G. L. Oliensis: "Interpretation of Test Data on Petroleum and Bituminous Products"; Sherlock Swann, Jr., and E. Emmet Reid: "Water-Soluble Products from High Temperature and High Pressure Oxidation of Heavy Hydrocarbons"; J. B. Hill and S. W. Ferris: "The Relation of Boiling Point and Some Other Properties of Petroleum Products"; Jacques C. Morrell: "Polymerization in Sulfuric Acid Refining and Cracked Distillates"; T. H. Rogers, F. V. Grimm and N. E. Lemmon: "Decolorizing Oil"; P. K. Porter and W. A. Gruse: "Measurement of Cup Grease Consistency by the Use of the Plastometer"; T. H. Rogers: "Absorption Studies on the Decolorization of Mineral Oils."

Among the papers in the section of gas and fuel chemistry were the following: W. G. Lovell and T. A. Boyd: "Chemical Equilibrium in Gases Exhausted by Gasoline Engines," and G. L. Clark, E. W. Brugmann and W. C. Thee: "Some Precision Experiments on the Ef-

fect of Knock-Inducers and Suppressors upon Gaseous Ionization."

Papers in the section of paint and varnish chemistry included W. T. Pearce: "A Study of Automobile Finishing Varnishes"; D. B. Keyes: "Solvents and Automobile Lacquers," and a symposium on "Cellulose Lacquers."

Another important section was the division of rubber chemistry. Papers in this division included the following: H. R. Thies: "Relation Between Absorption Power of Clays and Their Behavior in Rubber Compounds"; John T. Blake: "The Absorption of Water by Rubber"; R. B. Stringfield: "The Effect of Humidity in Rubber Testing"; C. R. Park: "Comparative Tests on Sodium Fluosilicate Coagulated Rubber"; L. B. Sebrell, C. R. Park and S. M. Martin: "Studies in the Physical Properties of Rubber"; Ellwood B. Spear and Robert L. Moore: "The Effect of Milling on Rubber Stocks"; Ellwood B. Spear and Robert L. Moore: "The Distribution of Carbon Black in Rubber Stocks"; W. B. Wiegand: "On the More Complete Evaluation of the Pigment Reinforcement of

(Continued on page 681)

24,000 Miles of New State Roads in 1925

WASHINGTON, April 9—A total of 24,000 miles of highway, or enough to circle the earth, is scheduled for construction during the 1925 season by the various State highway departments, according to information just secured by the Bureau of Public Roads of the Department of Agriculture. The State departments also plan to maintain a total of 217,794 miles of road.

Approximately \$405,000,000 will be available for construction and \$135,000,000 for maintenance by the State highway departments. It is difficult to forecast the operations of the counties, but the indications are that they will spend approximately \$463,000,000 for construction and maintenance. The estimated total expenditure for the year is, therefore, \$1,003,000,000.

The State highway departments plan to construct 5900 miles of asphalt, concrete and brick pavements, 11,600 miles of sand-clay, gravel and macadam roads and 6700 miles of improved earth road.

Comparing the funds available for 1925 with those for preceding years, it appears certain that road construction will go forward at about the same rate as in the preceding year. Since 1921 the total mileage of surfaced roads built each year has been between 30,000 and 40,000 miles.

TIMER COMPANY ORGANIZED

OSHKOSH, WIS., April 6—The Oshkosh Automotive Products Co., a new \$80,000 corporation organized here by George E. Prickett, Fred E. Wallen and James A. Meehan, will manufacture ignition specialties and also sell the Big Chief and New Rode Timers, the rights to which it controls.

5th Ave. Bus Control Acquired by Chicago

Elect Additional Members of Directorate of Holding Com- pany—Big Traffic Gain

NEW YORK, April 9—Chicago owners of stock in the New York Transportation Co., holding company for the Fifth Avenue Coach Co., took formal control of the coach concern at a meeting of the transportation company, when the number of directors was increased from thirteen to twenty-three, giving the Chicago interests a majority of the board. The following were elected to the directorate:

From New York—Philip T. Dodge, James B. A. Fosburgh, John C. Jay, Frederick L. Lavanburgh, William H. Lowe, Grayson M. P. Murphy, Charles H. Sabin, Henry Sanderson, Frederick Strauss, Frederick T. Wood and Edmond E. Wise.

From Chicago—Edward N. D'Ancona, Alfred Ettlinger, Leonard S. Florsheim, Harold E. Foreman, John D. Hertz, Albert D. Lasker, Otto W. Lehman, Charles A. McCulloch, John A. Ritchie, John R. Thompson, Harvey T. Woodruff and William Wrigley, Jr.

A large increase in passengers carried by the three operating subsidiaries of the Omnibus Corp. of Chicago is shown in the following report covering March and the first quarter of the year:

FIFTH AVENUE COACH COMPANY OF NEW YORK

	1925	1924
March	\$5,885,205	\$4,724,900
First quarter	14,986,319	12,203,580

CHICAGO MOTOR COACH COMPANY

March	4,281,000	2,801,000
First quarter	11,516,000	6,592,000

PEOPLE'S MOTORBUS COMPANY OF ST. LOUIS

March	2,097,203	748,126
First quarter	5,746,741	1,760,098

The Fifth Avenue Coach Company began the operation of 5.4 miles of route in the Bronx on Oct. 10, 1924. The St. Louis company opened 43 miles of new routes during the year, and the Chicago company began operation on the West Side in that city in March, 1924.

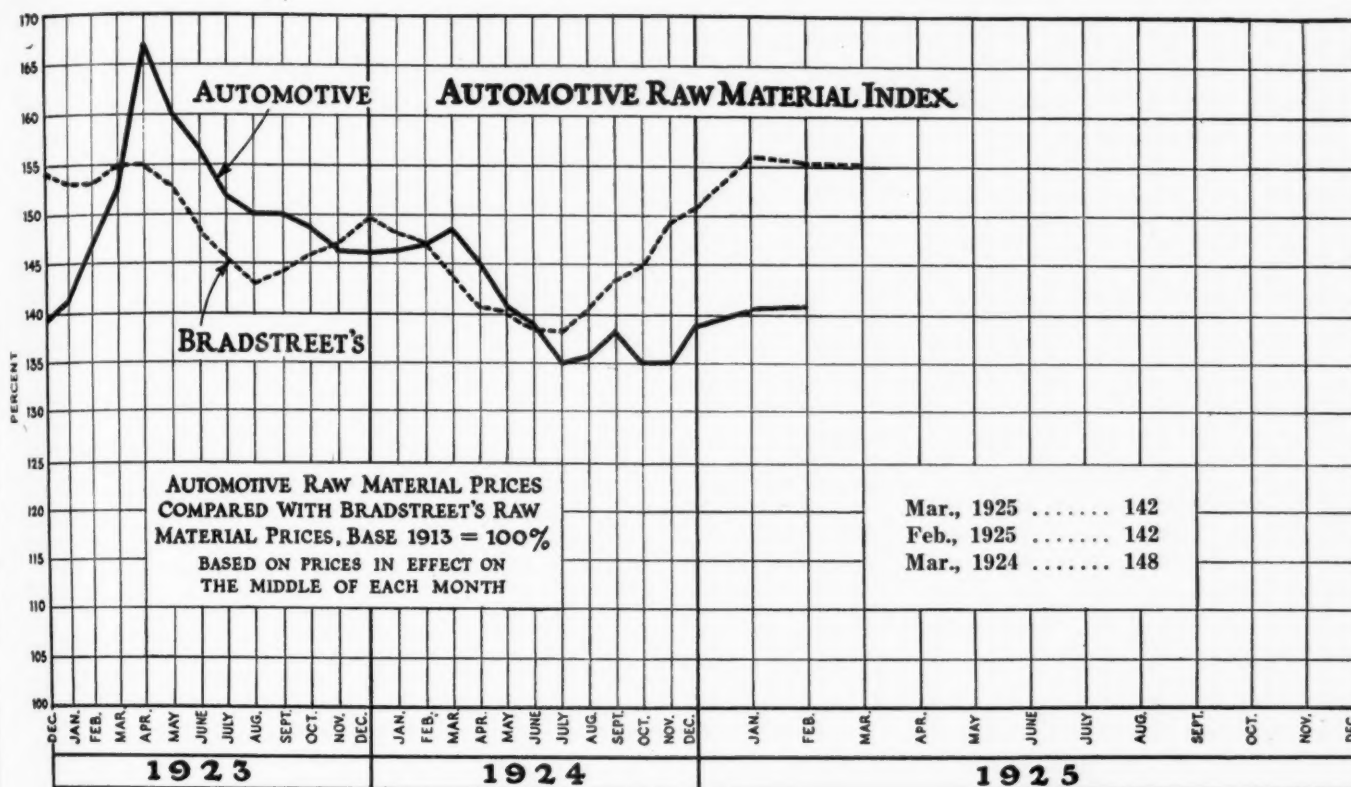
STAYNEW FILTER EXPANDS

ROCHESTER, April 7—The Staynew Filter Corp., manufacturer of air filters for automotive vehicles and air compressors, has enlarged its manufacturing plant at Rochester, added to its office force and appointed several new distributors and dealers.

REPUBLIC DISTRIBUTORS

ALMA, MICH., March 30—Official announcement is made by the Republic Motor Truck Co., Inc., of the appointment of David J. Jones, 13-19 Coal Street, Shamokin, Pa., and Service Motor Sales Co., Mandan, N. D., as distributors for Republic trucks in their respective cities and surrounding territory.

PRICES MAINTAINING EVEN KEEL



Detroit Deliveries Under 1924 Figure

DETROIT, April 8—New car deliveries in Detroit for the month of March totaled 6980, which compares with a total of 6824 for the first two months of the year combined, and with 8368 for March 1924. Closed car deliveries in this month were 5045, fourteen less than for March last year. Open car deliveries were 1935, comparing with 3309 in March, 1924. The truck total of 754 showed a gain over the 674 total a year ago. Tractor deliveries likewise increased from 12 to 28.

Hudson-Essex delivered 530 closed cars as against 6 open. Throughout the entire list of manufacturers closed car deliveries were much heavier than open. Ford delivered 1806 closed as against 1149 open. Chevrolet closed car deliveries were two to one. Dodge deliveries were six to one, and Buick's practically ten to one. Closed car deliveries in the higher priced lines practically excluded open cars.

Deliveries of Ford cars totaled 2955, or 42.4 per cent of the total business for the month. This compares with 56.8 per cent last year. All low priced lines including Ford made up 55 per cent of the total, as against 71 per cent last year. Cars in the \$1,000 price class and under, including Ford and other low priced makes, made up 73 per cent of the total, as against 80 per cent a year ago.

Deliveries of medium priced cars in March this year were 23.6 per cent of

the total, as against 17 per cent last year. Higher priced cars showed a fractional increase.

Ford delivered 470 of the 754 truck total. Reo with 35, Dodge with 33 and Chevrolet with 20 followed in the light truck field.

CALIF. DURANT INCREASES STOCK

OAKLAND, April 7—At the annual meeting of the Durant Motor Co. of California it was voted to increase the capital stock of the company from \$3,000,000 to \$5,000,000 to take over the assets and contract of the Star Motor Co. of California. Norman DeVaux, vice-president and general manager, said that the company's next quarterly dividend would be declared as of May 1.

The company is now building at the rate of 116 cars a day minimum and the year's production for 1925 is expected to be about 30,000 cars, it was stated.

Chemical Convention Topics

(Continued from page 680)

Rubber"; Henry Green: "The Ultra-Violet Microscope in the Study of Vulcanized Rubber Latex Globules"; S. E. Sheppard and L. W. Emerlin: "Electrodeposition of Rubber"; R. P. Dinsmore and A. O. Zimmerman: "Effect of Accelerators on Cure and Quality of Various Rubbers," and W. E. Glancy, D. D. Wright and K. H. Oon: "Note on the Rate of Combination of Sulfur with Rubber in Hard Rubber Goods."

Survey Shows Auto Tax Burden Unequal

WASHINGTON, April 8—A wide disparity between motor vehicle registration and taxes collected by the various States is shown in a study just made by the research division of the American Automobile Association. These figures, say the officials, leave no room for doubt that the question of taxation is one of the most serious problems confronting the industry today.

The survey not only discloses the wide difference in taxation as between the States but also the vastly rising curve of taxes on the motor vehicle. The average per vehicle tax of the State levy alone this year is \$17.35; in 1923 it was \$12.50, while in 1919 it was \$8.55. In other words, the State levy has increased 100 per cent in five years.

The figures on registration and taxes collected in 1924, not including Federal or personal property taxes, for the leading States are as follows:

	Registration	Taxes
New York.....	1,412,879	\$24,089,241
California.....	1,319,394	19,004,335
Ohio.....	1,241,600	11,635,329
Pennsylvania.....	1,228,587	31,196,917
Illinois.....	1,119,236	11,546,206
Michigan.....	867,545	12,404,546
Texas.....	801,712	14,266,766
Indiana.....	651,705	9,028,038
Iowa.....	616,128	8,979,170
Massachusetts.....	570,578	8,122,166
Missouri.....	540,500	4,525,914
Wisconsin.....	525,221	6,786,485
New Jersey.....	504,217	9,278,428
Minnesota.....	503,437	8,591,853
Kansas.....	410,891	4,222,930

Automotive Lighting Association Formed

Purpose of New Organization to Better Industry—Attempts Standardization

CHICAGO, April 6—Organization of the Automotive Lighting Association was perfected here recently when representatives of thirty-five automotive lighting manufacturers held their first formal gathering, elected a board of directors and appointed different committees to carry out the association's program for the present year.

This association, which has for its purpose the promotion of any activity seeking the betterment of automotive lighting, is an outgrowth of the Spotlight Manufacturers' Association. Its first meeting was held here last November, at which time preliminary plans leading to the present organization were drawn.

Jesse F. Brown of the S. & M. Lamp Co., Los Angeles, Cal., is chairman of the board of directors; C. C. Mortenson, Stover Signal Engineering Co., Racine, is vice-chairman, and W. S. Murtfeldt, National Lamp Works, General Electric Co., Cleveland, is secretary. Others on the board are T. K. Quinn, National Lamp Works, General Electric Co., Cleveland, and H. W. T. Collins, Cincinnati Victor Co., Cincinnati. The board was empowered to draw up a slate of officers which will be balloted on at the next meeting.

Five committees were appointed, on constitution and by-laws, legislation, standardization, statistics and publicity. In some States temporary committees have been at work since November working in connection with technical societies in attempting to standardize automotive lighting laws and regulations.

DENOUNCE ONTARIO TAX

TORONTO, April 7—The automotive dealers, distributors and equipment manufacturers of Ontario denounced in strong terms the gas tax as a surtax on the present license fee at the convention of the Auto Boosters' Club, the Automotive Equipment Association and the Automotive Retailers' Association, held in Toronto last week. Each of the three organizations held separate sessions during the day. The evening convention, like the banquet, was a joint affair, at which E. G. Weed, president of the "Boosters," presided. Russell Kelly of Hamilton and A. R. Mogge of Chicago, merchandising manager of the A. E. A., were the speakers at the joint session. The vigorous protests at the gas tax was crystallized in a strongly worded resolution.

Members of the trade report generally that actual car sales, as well as prospects, are considerably better than a year ago.

TRACTION EXPORTS HIGH IN FEBRUARY

WASHINGTON, April 9—February figures of exports of motor driven farm equipment amounted to \$4,435,309, the Agricultural Implements Division of the Department of Commerce announces. While this total is approximately \$160,000 smaller than that of the previous month when figures of \$4,595,268 were attained, it is larger relatively when the length of the two months in question is taken into consideration.

The only notable increase of the February items exported took place in the case of wheel tractors, when 1593, valued at \$1,038,508, were shipped abroad, as compared with 1293 during February, 1924, valued at \$870,296. Exports of motor driven farm equipment for the eight months ending in February 1925, amounted to \$35,865,317, which is slightly less than the exports for the eight months ending February, 1924, amounting to \$36,548,686.

Wild Driving Seen as Main Accident Cause

WASHINGTON, April 9—Forty per cent of 1606 accidents in the States of Montana, Oregon and Washington over an eight-month period were caused by reckless or careless driving, the Bureau of Public Roads announces here following tabulation of statistics compiled from newspaper reports of accidents in these States. Generally, it is shown that congestion of traffic was the principal cause of highway accidents in these States.

The bureau's study shows that Montana, with the lowest registration, has the smallest number of accidents per 1000 cars, while Washington, with the largest registration, has the most accidents per 1000 cars. This does not agree with national estimates, which indicate that the rate of accidents decreases with increased numbers.

The total number of accidents are classified as follows: Faulty operation by driver, 1020; faults of others than drivers, 191; faulty equipment 181; faulty highway conditions, 214. Of the latter 19 were caused by narrow roadways and 150 by skiddy surfaces.

ANNOUNCE HIGHWAY CONTEST

WASHINGTON, April 9—The sixth competition for the \$4,000 Harvey S. Firestone Four Years University Scholarship, conducted under the Highway Education Board here, is announced with May 1 next as the closing date. "Economics Resulting from Highway Improvement" will be the subject of the essays to be entered in the contest by high school students throughout the United States with 700 words the length limit.

Parts Production Up in Cleveland

Great Activity Noted Among Several Companies—New Officials Elected to Directorate

CLEVELAND, April 8—The rising tide of business in the automobile industry is being reflected in the production of parts makers in this city. Such concerns as the Midland Steel, National Acme Co. and Eaton Axle Co. have been receiving gradually increasing orders from automobile makers.

The National Acme Co. at its annual meeting reported that the influence of greater activity in the automobile industry is responsible for a large part of the improvement noted in affairs of Acme. The demand for this company's products is better from the foreign trade as well as from the domestic.

Amos Burt Thompson, attorney of this city, was elected to the board of directors and W. R. Mitchell and N. S. Rathburn resigned. Mr. Rathburn also resigned as secretary and assistant treasurer. He was succeeded by O. F. Douglass, formerly assistant secretary. A. W. Henn, president and treasurer; N. W. Foster, vice-president and general manager; D. H. Parker, assistant treasurer, were reelected. The board now consists of nine men instead of ten, as follows: C. S. Eaton, J. O. Eaton, N. W. Foster, E. L. Geisner, A. W. Henn, O. L. Henn, F. H. Hobson, A. W. Hopkins and A. B. Thompson.

2c. GAS TAX FOR IOWA

DES MOINES, April 7—The two-cent gasoline tax measure has been passed by the Iowa Legislature and will be effective upon publication. The legislation was known as the Bergman Bill, exempting purchasers of gas who used the product for other than motor propulsion on a public highway—a farmer exemption clause. The income will be about \$4,500,000 annually, and according to the bill will be divided equally among the primary, county and township road funds. It was this division that brought the hottest debate on the bill and the attempts to reach an agreement on this feature held up the measure throughout the session.

GRAND PRIX ENTRIES MADE

PARIS, April 1 (by mail)—This week the entry list was definitely closed with a total of seventeen cars for the French Grand Prix race, to be run at Montlhéry, 20 miles from Paris, on July 26. This event is for cars of 122 cu. in. piston displacement with two-seater bodies and one man aboard, the distance to be 620 miles. The starters will be 5 Bugattis, 4 Delage, 3 Alfa-Romeo, 3 Sunbeam and one each Mathis and Thomas Special.

Men of the Industry and What They Are Doing

Oakland Appointments

Hugh Higginbottom has been appointed Chicago district manager for Oakland Motor Car Co., succeeding L. J. Brocking, who recently resigned. Going to Oakland from the Dodge sales organization, Higginbottom first served as traveling supervisor attached to the office of the director of districts. His new territory includes northern Illinois, eastern Iowa and southern Wisconsin.

C. W. Matheson, vice-president in charge of Oakland sales, has named Edson H. Smith as district manager in Kansas City, succeeding A. P. Tenbroek, resigned. Smith joined the Oakland staff after 11 years with the Dodge company. His Oakland territory will include Kansas, western Missouri and part of Oklahoma.

Metzger Joins Rollin Staff

Carl J. Metzger has been named manager of the Chicago district for the Rollin Motors Co. His experience in the automobile field dates from 1898, when he opened the first agency for the Woods Motor Vehicle Co. in Chicago. Two years later he was appointed sales manager for the Woods company, and in 1912 formed the Metzger-Harrington-Argo Co. He retired in 1912 and just recently accepted the Rollin connection.

Cardway Exports Rollin Line

Col. Fred Cardway was recently named export distributor for the Rollin Motor Car Co. Overseas distribution of the tractors made by this company will continue under the direction of Ed. Sewell. Col. Cardway has for some years been connected with foreign merchandising of American cars, particularly the Peerless and Pierce-Arrow, and is now supplementing his lines with a lower priced four-cylinder car.

Salisbury Directs Nash Exports

E. H. McCarty, manager of sales for Nash Motors Co., has named H. H. Salisbury export sales manager. Mr. Salisbury was export manager for Maxwell Motor Sales Corp. and the Chrysler Motor Corp., and following that was vice-president of the John N. Willys Export Corp. of New York. J. L. Todd will be assistant export manager.

Grubb Now Star Official

D. A. Grubb, who was for eight years sales manager of the India Tire and Rubber Co., is now vice-president in charge of sales of the Star Rubber Co. He has for some time been an authority on truck and bus tires, and it is planned that the Star company specialize in this field.

Hayes Wheel Changes

M. S. P. Williams, Jr., until recently sales manager of the service division of the Hayes Wheel Co., has been made general sales manager. He will be as-

sisted by James M. Kerr, formerly in charge of the Chicago branch.

Smith Manages Durant Office

Durant Motors, Inc., has opened a wholesale distribution office in Milwaukee, under the direction of R. H. Smith. The territory will comprise the upper peninsula of Michigan and the eastern section of Wisconsin.

Cony Organizes New Firm

Rudolph Cony has resigned as president of the Sterling Auto Devices Co., Chicago, and has organized the Mid-City Auto Devices Co., in the same city to manufacture automotive accessories and equipment.

Arnold Takes Hoff Office

E. E. Arnold was recently named sales manager of the Hoff Metal Products Co., manufacturer of Hoff tire chains. He was formerly sales manager of the automotive division of the Johns-Manville Co.

Paige Gets Canadian Post

E. R. Paige, general sales manager of Willys-Overland, announces the appointment of J. C. Ruske as manager of sales for the province of Ontario and the Maritime Provinces.

Clare Heads Houde Sales

W. A. Clare is now directing the sales organization of the Houde Engineering Corp., manufacturer of Houdaille Hydraulic Shock Absorbers. He was for some years sales manager of the Atterbury Motor Car Co. of Buffalo.

Wheelock Leaves Velie

Henry T. Wheelock, for seven years advertising manager of the Velie Motors Corp., is now general sales manager of the Moline Pressed Steel Co., Moline, Ill.

Bradley Directs Autoparts Sales

R. C. Bradley is now sales manager of the American Autoparts Co., Detroit.

Start Investigation of Jobber Methods

DETROIT, April 8—The National Standard Parts Association through its executive office here, which is acting under the direction of the Merchandising Committee, is conducting an investigation into methods being used successfully by jobbers in merchandising parts. This is part of a big program through which the organization hopes to assist its members in increasing profitable business.

As its first step in this inquiry the committee set about to determine the ten most important replacement parts, which move is to be followed by the collection of ideas from all parts of the country as to the methods that have been found most successful in handling these particular items of merchandise.

C. B. Fraser, secretary of the association, announces that the investigation will require about six or eight weeks before completion. A comprehensive report will then be made embodying the committee's findings. The work already done, says Mr. Fraser, clearly shows that this report will contain a fund of extremely useful information to anyone interested in parts jobbing.

Among the main lines of activity undertaken by the association is development of a plan for catalog standardization. In dealing with this problem the N. S. P. A. has recognized three essential steps—standardization of type page size, punching and binders.

This already has been done. The official N. S. P. A. standard catalog page and binder have been adopted. The size of the page is 7½ by 10½ with an extra inch of width for loose leaf sheets.

Plants Speed Output

(Continued from page 674)

value of the present day automobile, with appeal to every section of the country and to the export trade. Secondly, the country is in better condition at the present time than for the past twelve months, with the farm districts of the South and Middle West and the Northwest coming in for products that they have been compelled to delay buying for the past several years. Behind all this is a more enthusiastic and better trained dealer organization.

Dodge Stock Issued

(Continued from page 675)

Corp. detailing its offer for the Dodge property. It follows:

"In response to inquiries General Motors Corp. states that, at the invitation of the trustees of the estate of John F. and Horace E. Dodge, deceased, it submitted a sealed bid for the properties of Dodge Brothers through its bankers, J. P. Morgan & Co. of New York, and has been advised that the property has been sold to Dillon, Read & Co. on higher bid.

"The General Motors Corp. submitted two bids, as follows:

First: An all cash bid of \$124,650,000 net; and

Second: A bid involving a cash payment of \$59,000,000 net, plus \$90,000,000 of non-interest bearing installment notes maturing in equal series over a period of nine years.

"The present worth of these non-interest bearing installment notes was approximately \$65,500,000. This, with the \$59,000,000 cash payment, shows the present worth or total cash value of this bid to be \$124,000,000, or substantially the same as our other bid."

Crude Rubber May Be Grown in U. S.

Firestone Reports Prospect of Development in Florida— Ford and Edison Aid

AKRON, April 6—Experiments now being conducted by the United States government, Thomas A. Edison, Henry Ford and Harvey Firestone may result in the development of a successful crude rubber industry in Florida, according to Mr. Firestone, president of the Firestone Tire & Rubber Co., who returned this week from his winter home in Florida.

The Akron rubber manufacturer asserted that British rubber restrictions, which he says have increased the price of crude rubber and have threatened the world with a rubber shortage, are driving the Americans to find a new source of supply.

Mr. Firestone has been a leader in the movement to have Americans produce their own rubber. He has employed expert rubber growers to make surveys for him concerning the practicability of establishing commercial rubber plantations in the Philippines, Central America, Mexico and Liberia. In Liberia the Firestone company already is operating a plantation and is preparing to plant rubber trees on a large scale.

The price of crude rubber, which dropped to 17 cents a pound after the United States Congress appropriated \$400,000, has been forced up to 44 cents by more British restrictions, it is alleged.

In Florida the Firestone party tapped large rubber trees on the Edison estate at Fort Myers, examined young trees on the Ford farm at Labelle, and inspected many varieties of rubber trees being raised at the government experimental farm near Coconut Grove.

Mr. Edison, who accompanied the

party on several tours, made several important suggestions regarding extraction of latex, according to Mr. Firestone. His methods would be a big improvement over those used on the plantations of the Far East, he said. By hastening and increasing the flow of latex, the cost of production of crude rubber would be materially lowered.

Every ten-cent advance in the cost of crude rubber means an assessment of about \$75,000,000 against America, Mr. Firestone asserts. He predicts that rubber restrictions will cost American automobile owners a large sum this year.

Moon Introduces Two New Sedan Models

ST. LOUIS, April 7—Moon Motor Car Co. has brought out new two-door and four-door sedan models, both seating five passengers. The former is finished in marine blue and gray, and the latter in two-tone green, both having a broad belt line panel. Upholstery is gray mohair, and interior hardware has the Butler finish. Among the new features of these models are sun visors integral with the top; new design instrument board with all instruments, including gasoline gage, grouped under one glass; a patented type of gas and spark control at the head of the steering column equipped with a lever which controls all exterior lights of the car, and arm rests on the rear seats of the four-door sedan.

WATCH FORD PLANE INTERESTS

WASHINGTON, April 6—The development of the Ford Motor Co.'s airplane interests is being watched with close interest by commercial aviation companies in Europe, where aviation has become recognized as a modern method of transportation. In a report just made to the United States Department of Commerce by Commercial Attaché Chester I. Jones, transmitting the report of the French Ministry of Aeronautics, he points out that during 1924 French airplane commercial companies carried 16,729 passengers, traveled 3,500,000 kilometers with but five accidents and a total loss of five lives.

WILSON CO. INCORPORATES

MOLINE, April 7—The E. H. Wilson Manufacturing Co., which is the successor to the Moline Body Corp., has been incorporated with capital stock of \$975,000. The company will manufacture and deal in motor vehicle bodies and accessories, and may engage in other automotive activities. The incorporators include E. H. Wilson, who is president, C. F. Lundberg and F. J. Effland. The headquarters of the plant will be at 2430 Third Avenue. Orders on hand will enable the operation of the plant with a full force of employees, and it is hoped to increase the number during the coming year.

FINANCIAL NOTES

Goodyear Tire & Rubber Co., of Canada, has declared another payment of deferred dividend on its preferred stock, in conjunction with the regular payments on both preferred and prior preference stock. C. H. Carlisle states that the past six months of the current fiscal year the company's production has exceeded that of any similar period since the company has been in business.

Packard Motor Car Co., as of February 28, 1925, reports current assets of \$30,250,934 and current liabilities of \$3,484,671, leaving net working capital \$26,766,263, as compared with \$27,773,965 on August 31, 1924. Inventories during the six months' period were reduced from \$11,121,600 on August 31 to \$8,606,110 on February 28.

Fisk Rubber Co. Building called for payment May 1, 1925, at 102 and interest, the entire issue of its first serial 6s, due May 1, 1926-35, at S. W. Strauss & Co., New York.

Elgin Motor Car Corp., shares were removed from unlisted trading privileges on the New York Curb Market April 3.

Peerless Truck & Motor Corp., as of December 31, 1924, reports total current assets of \$4,835,361 and total current liabilities of \$1,443,922, leaving net working capital of \$3,391,439, as compared with \$5,049,574 as of December 31, 1924.

Detroit, Toledo & Ironton R. R. Co., for February, 1925, reports gross earnings of \$976,569 and net operating income of \$225,836, as compared with \$962,574 and \$296,020 respectively as for February, 1924.

Omnibus Corp., announced April 3 that permanent certificates, representing the preferred stock, and the permanent voting trust certificates, representing the common stock, were available for issuance.

ACCIDENTS DROP SLIGHTLY

WASHINGTON, April 9—A total of 340 persons were killed in automobile accidents during February in 74 cities having a total population of more than 30,000,000, according to figures compiled by the National Safety Council. This was a slight decrease as compared with the fatalities in the preceding month. About 77 per cent of all motor vehicle fatalities were pedestrians.

CANADIAN TIRE EXPORTS

WASHINGTON, April 9—Canadian exports of casings increased from 63,864 in January to 67,016 in February. Trade Commissioner Lynn W. Meekins at Ottawa has just advised the Automotive Division. The number of inner tubes exported increased from 70,800 to 80,318, while solid tires increased from 775 to 1016.

NEW PENN TRUCK BRANCH

WILSON, N. C., April 5—The Penn Truck Manufacturing Co. will locate a branch house in this city at an early date. W. Sofield, president of the company, was here the past week completing plans for the new branch. The company's principal plant is in Philadelphia and it has a branch at Poughkeepsie, N. Y.

Prices Reduced on Case Models "X" and "Y"

RACINE, April 6—The J. I. Case T. M. Co. has recently announced a reduction in price of \$100 on all "X" models of Case cars. The seven-passenger touring and seven-passenger sedan, comprising the line on the "Y" chassis, have also been cut in price \$250 and \$350, respectively. The "J. I. C." model is continued without any change. The following schedule shows the old and new prices on the "X" and "Y" chassis:

	Old Price	New Price
"X"		
3-passenger roadster.....	\$1,670	\$1,570
5-passenger touring.....	1,695	1,595
5-passenger sub. coupe.....	2,390	2,290
5-passenger victoria.....	2,390	2,290
5-passenger sedan.....	2,485	2,385
"Y"		
7-passenger touring.....	2,475	2,225
7-passenger sedan.....	3,325	2,975

Cleveland Dealers See No Spring Rush

Association Contends Buying Is Now Spread Through Entire Year

CLEVELAND, April 8—The Cleveland Automobile Manufacturers and Dealers Association does not agree with those who argue that a spring rush of business will cause a shortage of cars. On the contrary, the association expresses the opinion that the spring rush in the automobile industry is a thing of the past.

The peak demand for cars which formerly came into evidence along about April 1 can no longer be counted on, says the association. A statement is made as follows:

The peak has been flattened into a constant demand extending throughout the year. This is not to predict poor business for spring, but a good business level over a longer period. Demand will not be so greatly concentrated within a few weeks of the spring.

A chief contributing factor to this end is the closed car. The spring rush, as we used to know it, was inherited from the days of the Impermanent top. While the one man top was being kidded to death, along came the closed car, and the effect on sales today is too well known to need further comment. At the same time, however well known may be the general effects of closed

car selling, there are some particular aspects not fully realized. Let us hark back to last spring for instance. That furnished a striking example of the failure of the spring rush to materialize. Factories and dealers had stocked up in expectation of an old-fashioned peak of demand. When the curve failed to shoot upward, what cars did dealers find accumulated in store houses? Open models.

A large betterment in the automotive industry could not come without an improvement in general business conditions. General, basic, commercial conditions began to show improvement in the summer. Adoption of an economic program for Europe, rising grain prices, cheaper money and a bull stock market foretold greater industrial activity. In our own business this began to take obvious form at the show season. The used car market, which has hitherto awaited April, has been liberal for some weeks, and once again we find the demand steady.

Funeral Cars Added to Kissel Production

HARTFORD, WIS., April 8—Kissel Motor Car Co. has started production on a number of funeral cars, marking its entrance upon a new field of activity which the company believes has great promise. The new Kissel hearses are built on the standard Kissel chassis and are hung about three inches lower than the ordinary hearse. The cars were designed by Kissel engineers and the bodies are custom built in the Hartford factory.

Total sales for the Kissel company in the week ending March 28 were the largest in the organization's history for a single week except on one occasion. Sales for the week ending March 28 exceeded the same week of last year by 405 per cent. March sales showed a gain of 310 per cent over March, 1924. The company has increased its working force 50 per cent since stepping up production and by the end of April expects the employment figure to be at the highest point in Kissel's existence.

A. E. A. SEEKS ECONOMY

CLEVELAND, April 8—In preparation for the next standardization meeting of the Automotive Electric Association, to be held here May 4, the secretary, Earl Turner, is sending out questionnaires to bus manufacturers and operating companies. From the data obtained it is hoped that standards for generators and other bus electrical equipment may be determined which will promote economy both in bus manufacture and maintenance.

NEW PLANT FOR UNIVERSAL

GARWOOD, N. J., April 8—The Universal Tool Co. is now located in its new building at Cranford, N. J., about a mile and a half from here. The move marks the third forward step in the company's growth, first occupying small quarters at \$13 a month in Baltimore, next renting a factory in Garwood and finally building its own building in Cranford. The company produces the Universal cylinder reboring tool.

METAL MARKETS

Conditions in the steel industry are somewhat confusing and contradictory. While mill operations in general are being curtailed in response to the shrinkage of the backlog of orders, several mill units in the Mahoning Valley have been placed in commission within the last few days. This indicates that there is much unevenness not only in the demand for the different steel products but also in the condition of individual producers' order books. In spite of the fact that 4.40c., Pittsburgh or Youngstown base, has become rather general as price level for No. 22 gage, full-finished auto body stock, rollers and finishers of automobile sheets seem to be better off than most other classes of steel producers. Black sheets have sold down to as low as 3.35c., Pittsburgh, with 3.50c. a nominal maximum.

With new business in the heavier steel products rather light and old orders drawing nearer and nearer to completion, producers are again contemplating the unknown quantity in the steel situation—rate of consumption and reserve stocks in consumers' hands. In some industries there is much leeway for contradictory opinions as to whether consumers have much or little steel reserve and as to whether or not they are playing close to the cushion in ordering. So far as automotive steel is concerned, the conditions are very much of an open book. Buying is closely adjusted to the operating schedules of automotive plants. The interval between specifications and shipping orders to steel mills and the working up of the steel in the automotive plants is a matter of weeks and not months, and no secret is made of the fact that steel reserves at automotive plants are negligible in extent.

With no indication of a sudden expansion of steel demand from any quarter and competition among mills keener than ever, automotive purchasing agents are not losing any sleep over the future course of steel values. If at times passenger motor car builders are compelled to put special expeditors to work in order to have a certain steel shipment rushed through, this does not indicate increased eagerness for steel supplies as a whole but merely that in the instance of this particular shipment operating schedules call for this lot before the purchasing agent thought it would be needed. Daily newspaper reports of isolated cases of expansion in steel output and this or that rainbow-chasing statement of some celebrity must be read with appreciation of their proximity to the stock market quotations.

Pig Iron—While the market is more or less idle, the possible effect of the dislocation in the Pennsylvania and West Virginia coal mines on the coke market and, in turn, on the pig iron situation is given some consideration. Sharp declines in scrap have caused some foundries to take an interest in foundry scrap offerings.

Aluminum—The market continues quiet and of a routine character. Some metal arrived from Norway on Saturday, consigned to independent importing interests, but all of this is earmarked against previously placed contracts.

Copper—The red metal continues to see-saw between 13 and 14 cents. Second quarter orders for automotive brasses are slow in materializing.

Tin—Recent new low records were established in the face of marked improvement.

Dunlop Profits Gain Despite Losses Here

LONDON, March 28 (by mail)—The report of the Dunlop Rubber Co. for 1924, issued today, shows that a net profit of £1,500,151 was earned during the twelve months, as compared with £1,451,792 during the previous accounting period, which covered eighteen months, so that the improvement for 1924 is approximately 50 per cent. But although the net profits for last year are equal to 22 per cent on the reduced ordinary share capital after deducting preference dividends, no ordinary dividend is to be paid, the directors considering that the company should "start upon its new era of prosperity in a position of the greatest possible financial strength."

The net profit quoted for 1924 does not take into account the American company's deficit for that year, amounting to \$414,463 after providing for bond interest, depreciation, etc. This American deficit, the directors state, is incidental to the starting of a new business of this magnitude and was anticipated at the time the decision to operate the factory was arrived at. The output of sales of the American company at the present time are stated to be higher than was expected, and the directors remain satisfied that the policy of persevering with the development of this company is a wise one.

Calendar

SHOWS

- April 1-17—Sydney, Australia, Royal Agricultural Show. Embraces automobile exhibits.
- April 8-14—Bandoeng, Batavia, automobile show under auspices of Netherlands Indies Jaebours Fair Association.
- April 22-May 7—Melbourne, Australia, International Automobile Show, under the auspices of the Chamber of Automotive Industries, in conjunction with the Royal Automobile Club of Victoria.
- May 20-26—Detroit, Second Annual Automotive Maintenance Equipment Show, General Motors Building, conducted by the National Automobile Chamber of Commerce, with cooperation of the Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers,

Automotive Equipment Association, Automotive Electric Association and the Automotive Manufacturers Association, Sam Miles, manager.

- Sept. 21-26—London, England, Annual Cycle and Motorcycle Show under auspices of the British Cycle and Motorcycle Manufacturers and Traders Union, Ltd.
- Oct. 8-17—London, Olympia passenger car show.
- Oct. 29-Nov. 7—London, annual truck show.

RACES

- April 30—Fresno, Cal.
- May 11—Charlotte, N. C.
- May 30—Indianapolis.
- June 13—Altoona, Pa.
- June 20—Baltimore, Washington Speedway, Laurel, Md.
- July 26—Paris, Montlhery Track, French Grand Prix.
- Sept. 7—Altoona, Pa.

- Sept. 30—Fresno, Cal.
- Oct. 10—Baltimore-Washington Speedway, Laurel, Md.
- Oct. 24—Charlotte, N. C.
- Nov. 26—Los Angeles.

CONVENTIONS

- May 6-9—Ninth annual meeting of the American Gear Manufacturers Association at William Penn Hotel, Pittsburgh.
- May 20-23—Detroit, General Motors Building, National Automotive Service Convention conducted by the National Automobile Chamber of Commerce with the cooperation of Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and Automotive Manufacturers Association.

- June 22-27—Summer convention of the Automotive Equipment Association at the Broadmoor Hotel, Colorado Springs, Colo.

S. A. E. MEETINGS

National

- April 29-30—Tractor meeting in Chicago.
- June 15-19—Summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.
- Sept. 15-16—Production meeting and exhibition.
- Sept.—Automotive Transportation meeting.
- Nov.—Service Engineering meeting.

Sectional

- June 15-19—Summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.

May Stage Airplane Reliability Tour

DETROIT, April 6—A meeting was held here recently under the auspices of the Society of Automotive Engineers to consider the feasibility of and plans for holding this year an airplane reliability tour, which has been suggested from time to time, particularly by Col. Paul Henderson, Second Assistant Postmaster General in charge of the Air Mail Service.

Among those present at the conference were Col. Paul Henderson; W. B. Mayo, chief engineer of the Ford Motor Co.; C. M. Keys, president of the Curtiss Airplane Co.; R. W. Schroeder, Underwriters Laboratories; Luther K. Bell, traffic manager of the Air Mail Service; W. B. Stout, Stout Metal Airplane Co.; Paul G. Zimmermann, vice-president for aviation, and Vice-President H. D. Church and General Manager C. F. Clarkson of the Society of Automotive Engineers.

The tour, which would be an intercity affair, would not be a race but an event to demonstrate the usefulness of the airplane. The future of aviation de-

CALIFORNIA WOMEN IN SAFETY DRIVE

WASHINGTON, April 9—Starting June 1 California women will begin a six months' competitive campaign to reduce street and highway accidents in their respective communities, according to a report just received here by Secretary of Commerce Hoover as chairman of the National Conference on Street and Highway Safety.

This campaign, which is being organized by the Women's Division of the California Development Association, will be participated in by the California State Automobile Association, the Automobile Club of Southern California, the State Parent-Teachers Association, the State Federation and the General Federation of Women's Clubs, the Police Departments of San Francisco and Los Angeles, representatives of railroad and transportation companies and a number of other state and local organizations.

pendes very largely on individual fliers who own their machines. It is understood that there are at least thirty of these residing in and about Detroit at this time.

Word was received at the Detroit conference from the National Aeronautic Association expressing general approval of the inauguration in the aeronautic field of intercity airplane tours for civilian contestants. The matter had been discussed at length at a recent meeting of aeronautic engineers held in New York by the Society of Automotive Engineers. Paul G. Zimmermann is chairman of the Aeronautic Advisory Committee of the society.

Urges Closer Watch on Tire Export Sales

WASHINGTON, April 9—American tire manufacturers should give closer attention to foreign sales during the coming months on account of changing conditions in the export tire trade, the Automotive Division of the Department of Commerce advises. Further statement is made that this applies particularly to those companies who have curtailed their export activities in the last two years. A report says:

In 1924 the trend in American tire exports was steadily upward after a long decline, and with the announcement of tire price increases by European competitors in March and April of 1924 the upward trend was accentuated. Further price increases have been made during the first two months of 1925. While the price situation is now sufficiently improved to make increasing competition from American firms well worth while, the margin of profit must continue slight. Those American firms which have supported their foreign agents during the period of very low prices will naturally benefit first from the improved situation.

It is still difficult to induce foreign firms to take on new lines of tires, but with the reasonable hope of still further price increases in store, the effort may well be considered worth while. American firms undertaking an expansion of their foreign distribution are invited to call on the Rubber Division for information regarding tire prices in foreign countries, customs duties on tires, and lists of foreign firms which might be interested in their importation.

ITALIAN ROAD CONGRESS

PARIS, April 1 (by mail)—An international road congress, in which the Italian government is taking the initiative, is announced, to be held in Milan from Sept. 6 to 13, 1926, following up the four previous congresses held in Paris, Brussels, London and Seville. The work of the congress will be divided into two sections, dealing respectively with road construction and maintenance and with traffic. The Italian committee is arranging for the delegates to visit the Monza track and the special automobile roads recently built or still under construction, from Milan to the Italian lakes. The closing meeting of the congress will be held at Rome.

NEW GELLMAN PLANT

ROCK ISLAND, April 7—Ground was broken this week for the Gellman Manufacturing Co.'s new factory building at First Street and Fourth Avenue, for the manufacturing of "Polly" wrenches and similar accessories. The building will be 64 x 140 ft., one story high of brick construction. The company owns a three-acre tract there.